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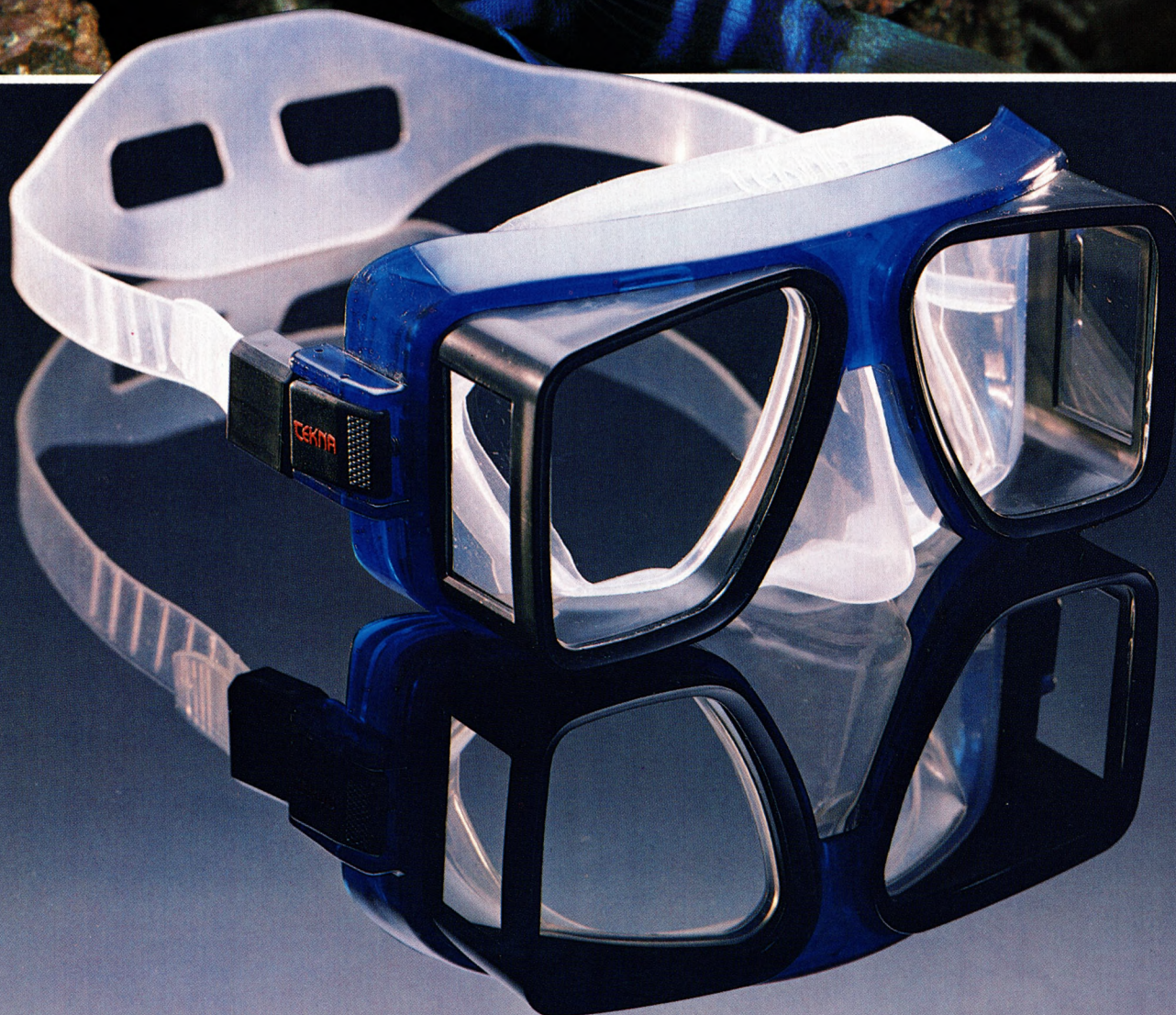


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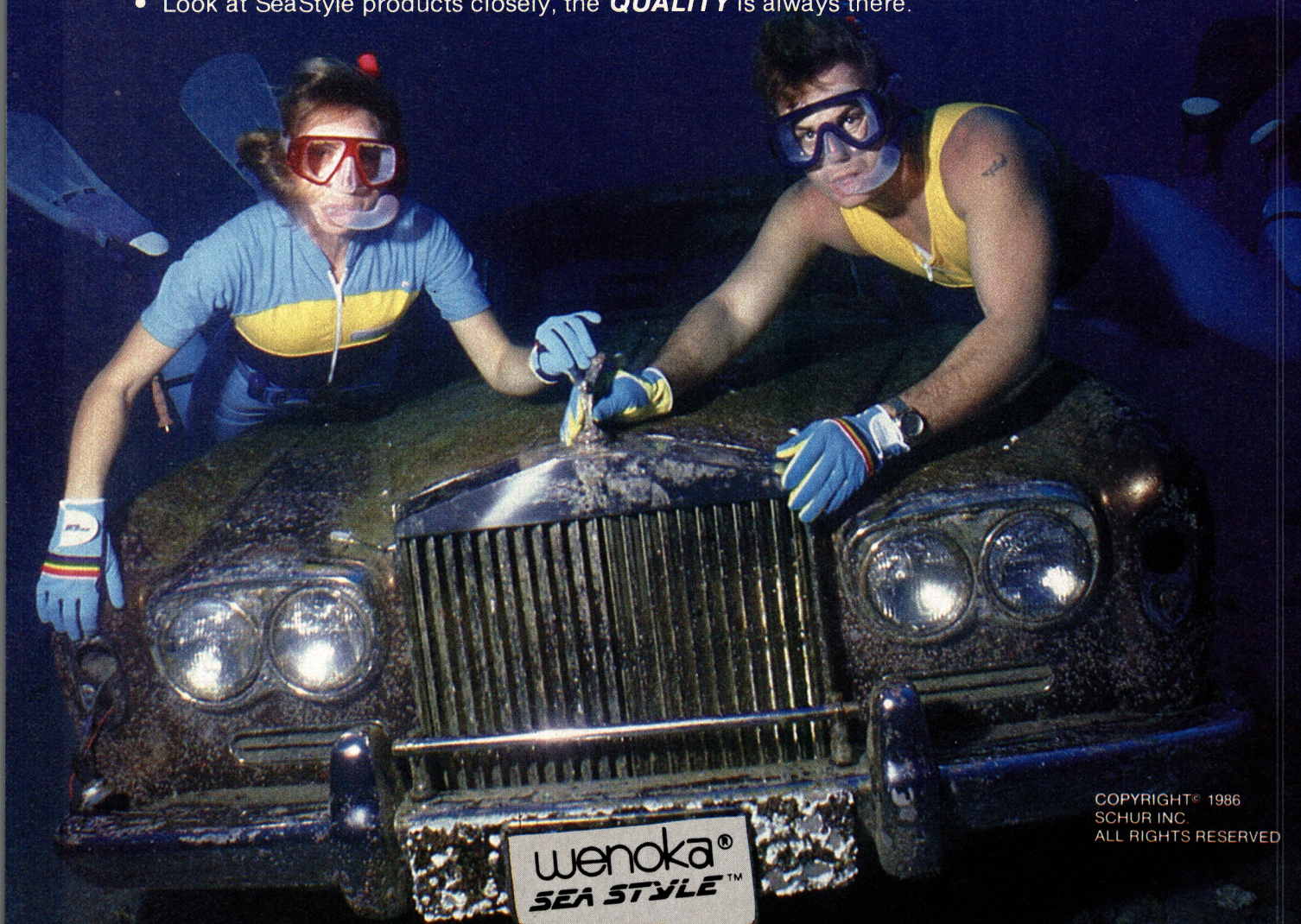
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COVER

Mel Fisher with gold chains and emeralds discovered recently on the Atocha wreck site. A hoard of such gems have been recovered and more are expected. Inset: This emerald may be worth \$1 million. Photos/Steve Lucas.

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SDM Editorial

BY PAUL J. TZIMOULIS

LAGUNA BEACH— A CLOSE ONE!

Each year the rights of sport divers are being eroded. The process occurs slowly and subtly—a new regulation here, a town ordinance there.

When viewed individually, each event seems logical and reasonable, but the overall impact is devastating. Governmental agencies and bureaucrats can rip off our rights in a wink, if we are not ever vigilant and committed to preserving our individual freedoms.

Remember one thing: There is no giant, well-heeled lobby group protecting this sport. The only ones looking out for divers' rights are divers themselves.

A good case in point is the recent battle to save Laguna Beach, one of California's oldest and best known beach diving locations. For more than 35 years divers used this area in harmony with local residents. Yet divers were singled out to be banished from this sector of public shoreline. Here is how it happened.

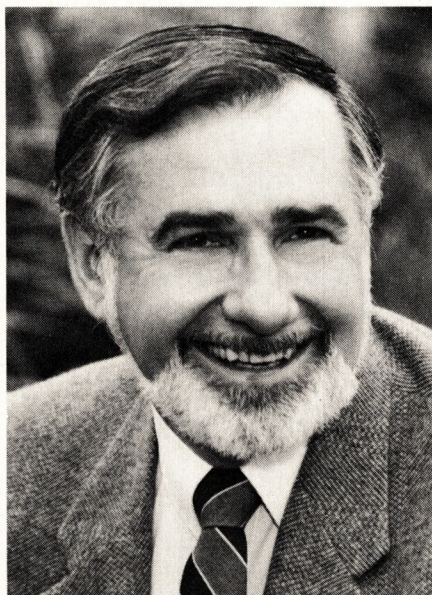
In late spring of this year the Laguna Beach City Council was approached by a group calling itself the Laguna Beach Marine Life Preservation Association. This group claimed divers were doing a good deal of harm to the local marine environment and it was seeking action to prevent further damage.

The group of concerned marine environmentalists made a five point proposal. First, these people wanted the boundaries of a nearby marine ecological reserve extended to include the Laguna Beach area. They claimed the marine life was being depleted by overfishing, illegal poaching and overcrowding by divers.

Second, they wanted signs posted warning divers and the public the area was a reserve and refuge.

Third, they wanted the city of Laguna Beach to establish a diving permit system, thus limiting the number of classes that could use Laguna beaches.

Fourth, they wanted the city to charge permit fees, which could then be used for



funding warning signs, enforcement patrols, publishing regulations and, of course, administration of the program. The association felt the city could raise thousands of dollars in this manner.

Fifth and final, they wanted to completely prohibit night diving and restrict classes to early mornings—from 7:00 to 10:00 am.

Needless to say, the diving community was stunned by this incredible proposal. Diving at Laguna Beach has always been safe and the majority of divers dutifully observed all California Fish & Game regulations. In fact, these regulations are frequently taught to students in classes. What went wrong?

Upon investigation of the situation, the real reason for the proposal came to light. The so-called Laguna Beach Marine Life Preservation Association turned out to be a group of homeowners in the North Laguna vicinity. This happens to be the area where diving and other public beach activities become intense during the summer months.

The homeowners were fed up with the summer crush—thousands of beach goers creating traffic jams, parking problems, noise and other nuisances. The continued growth of Southern California's population is creating overcrowding.

Yet diving hadn't really changed that much. It was the same numbers of divers and instructors conducting open water training. Why were the divers being singled out?

It seems that divers, in their wetsuits, are one of the only special interest groups easily recognizable. While other types of beach goers look alike, divers stick out in a crowd. And, since divers do their thing in secret (underwater), the general public tends to be suspicious of their motives and activities. Since the homeowners cannot see what the divers are doing U/W, it is easy to assume they must be destroying the environment.

Fortunately in this case, the diving community quickly caught onto what was happening. They responded to the crises in an effective and diplomatic manner. At a subsequent City Council hearing the diving community presented a strong case in its defense. It was pointed out that private and commercial fishermen take far more game than the few divers who spearfish or hunt lobsters.

It was also proven that shoreline tidepools were being impacted by tourists and school children who were taking marine life as souvenirs and field trip specimens. Divers rarely touch these pools, but simply pass over them on the way out to deeper water. These facts had been presented long ago—in a 1982 environmental impact study by the government.

The diving community backed up its defense with expert scientific testimony. The council heard statements from Dr. Bert Kobayashi of Scripps Institution of Oceanography, Professor Joe Valencio of Saddleback College's Marine Technology Department and Dr. Noel Davis, a marine environment researcher. All three scientists presented the same message. There is simply no evidence that suggests divers are responsible for extensive damage to the marine environment or for the depletion of marine life in the area. The divers had a bulletproof case, but the battle was not yet won.

During this hearing it was learned that a group of divers had been unruly. There was evidence their actions had interfered with the rights of the homeowners. It's amazing how a few troublemakers can ruin things for everyone.

It was at this point the divers made a wise move. They suggested that a coalition be formed from the Laguna Beach homeowners, the beach lifeguards and the divers. Representing the divers were

(Continued on Page 117)

NEW FOR 1986

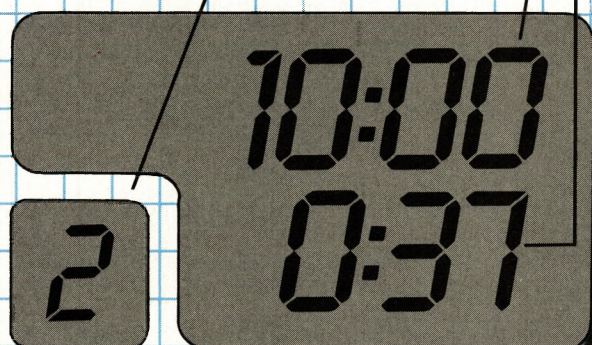
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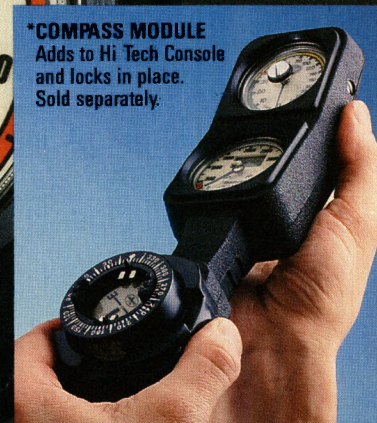
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Diver's Calendar

IQ86

Florida International College in North Miami, Florida will be the site of the **October 3-5** International Conference on Underwater Education. There will be seminars, workshops and clinics. For information contact Walt Amidon, NAUI Headquarters, P.O. Box 14650, Montclair, CA 91763-1150; (714) 621-5801. ❦

CEDAM EXPEDITIONS

CEDAM International is offering a combination marine/terrestrial archaeology expedition to the lost city of Nueva Cadiz, Venezuela, **October 3-10**. For more information contact CEDAM International, Fox Road, Croton-on-Hudson, New York 10520; (914) 271-5365. ❦

TRASHFEST

The Texas Gulf Coast Council of Diving Clubs (of Houston, Texas) is sponsoring its 11th annual Trashfest **October 4** at Hinman Park on the banks of the Comal River in New Braunfels. The event will help clean up this area and team competition, door prizes, a beer bust and food will be featured. For information contact Gene or Sara Baugher (713) 433-4761. ❦

MADISON FILM FESTIVAL

Four Lakes and Hoofers Scuba Clubs are hosting the first Madison Film Festival **October 4** at the Madison Sheraton Inn and Convention Center, Madison, Wisconsin. The event spotlights diving in the Great Lakes. Tickets are \$4 and are available at the door or by mail. Contact Four Lakes Scuba Club, P.O. Box 6112, Madison, WI 53716. ❦

DIVE TO ADVENTURE

Jack McKenney's Dive to Adventure program will be presented on Saturday **October 11** at the Macon Junior College in Macon, Georgia. His films, *Seven Wonders of the Diving World*, *The Undersea Adventures of Jean Jacques Dubois*, *Ten Fathoms Deep* and *Beneath the Sulu Sea* will be featured.

For information contact Judy Trawick, Middle Georgia Divers, 438 Moore Road, Griffin, Georgia 30223; (404) 227-8989. ❦

DUPONT BULL ROAST

The DuPont Employees Skin & Scuba Diving Association will sponsor a Bull Roast at St. Elizabeth's Social Hall in Wilmington, Delaware **October 11**. The feast will feature entertainment consisting of a disk jockey, an artifact display from local wrecks and slides taken by club members. For information call Tom Bennett (302) 322-9481. ❦

U/W PUMPKIN CARVING

The Site Sea'ers Diving Society, in cooperation with the Dive Site Scuba Center, will host the fifth annual Underwater Pumpkin Carving Contest at Lake Tenkiller, Oklahoma **October 25**. For details contact the Dive Site Scuba Center, 4405 South Sheridan, Tulsa, OK 74145; (918) 664-5717. ❦

AAUS CONFERENCE

The American Academy of Underwater Sciences is presenting the annual Scientific Diving Conference **October 30-November 2** at the Florida State Conference Center, Florida State University, Tallahassee, Florida. Workshops will follow the conference. Additionally, Jean Michel Cousteau will lecture on Archaeology and the Sea at the university on October 28. For information contact the Center for Professional Development and Public Service, The Florida State University, Tallahassee, FL 32306-2027. ❦

NORTH PACIFIC UMS MEETING

The annual meeting of the North Pacific Chapter of the Undersea Medical Society will take place in Seattle, Washington **November 6-8**. For information contact Richard Dunford, Secretary-Treasurer, Virginia Mason Hospital, P.O. Box 1930, Seattle, WA 98122. ❦

WINTER WORLD

Winter World Sport Show of Milwaukee, Inc., in cooperation with Bennett's Academy of Ski & Scuba and local dive shops, will offer this year's Winter World "sun and snow" consumer trade show to the Milwaukee, Wisconsin area **November 7-9**. For information contact Winter World Sport Show of Milwaukee, Inc., 3806 South Rutland Avenue, St. Francis, WI 53207; (414) 744-1206. ❦

L.A. COUNTY SAFETY SEMINAR

The Los Angeles County Underwater Instructors Association will host a diving safety seminar **November 8**. For information contact Los Angeles County Parks and Recreation (213) 327-5311. ❦

SEAVIEW '86

Rick's Pro Dive 'N Ski Shop of North Little Rock, Arkansas will present Seaview '86 **November 8** at the Northeast High School Auditorium, North Little Rock, Arkansas. Jack McKenney will show a selection of his films and will autograph copies of his latest book. There will be exhibits and door prizes.

For information contact Rick's Pro Dive 'N Ski Shop, 2323 North Poplar, North Little Rock, AR 72114; (501) 753-6004. ❦

DIVE NEW JERSEY

The New Jersey Council of Diving Clubs will host its tenth annual symposium, Dive New Jersey... and Beyond, at the Count Basie Theater, 99 Monmouth St., Red Bank, New Jersey **November 8**. Exhibits will be included as will presentations and awards for an underwater photography contest. For information contact Gerry or Jaye Niel, 574 Schuyler Way, Union, NJ 07083. Tickets are available through local dive shops or at the door. ❦

CALTECH/WATERMAN

The Stan Waterman Show will return to Caltech's Beckman Auditorium **November 8**. Beckman Auditorium is at South Michigan Avenue and Constance Street in Pasadena, California. For information call the Caltech Ticket Office at (818) 356-4652. ❦

skin diver

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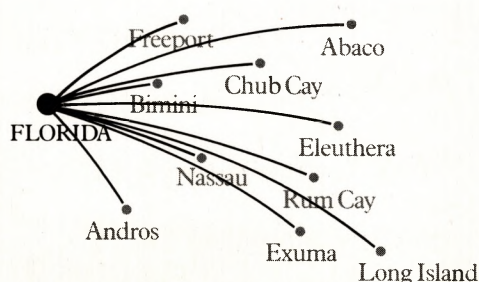
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It's Better In The Bahamas.

Scuba Quiz

Category: U/W Photography

Topic: TTL Photos

By Dennis Graver

TTL (through-the-lens) photography controls flash exposure automatically and this technology can now be used underwater. Just how good is a TTL system? What are its advantages and disadvantages? How does it work and how do you use it? Test your understanding and learn more about this topic with this month's quiz. The answers to the questions are on the following page.

1. A TTL system measures the light:

- ☐ A. Coming from the flash unit
- ☐ B. Coming through the camera lens
- ☐ C. Reflected from the film in the camera
- ☐ D. None of the above

2. A TTL system governs exposure by controlling the:

- ☐ A. Shutter speed of the camera
- ☐ B. Film speed setting of the camera
- ☐ C. Duration of the flash
- ☐ D. None of the above

3. Which of the following is *not* an advantage of TTL:

- ☐ A. Allows depth of field control with f/stop selection
- ☐ B. Helps ensure correct exposure for varying light
- ☐ C. Reduces the number of adjustments required
- ☐ D. Makes all exposure adjustments automatically

4. A TTL system can control exposure to a minimum distance of:

- ☐ A. Three feet
- ☐ B. One foot
- ☐ C. One foot and closer
- ☐ D. None of the above

5. TTL exposure is at its most accurate when:

- ☐ A. The subject is within a few feet
- ☐ B. The subject is large in the frame
- ☐ C. The subject is in the center of the frame
- ☐ D. All of the above

6. TTL exposure is at its least accurate when:

- ☐ A. The subject is small in the frame
- ☐ B. The subject is highly reflective
- ☐ C. The background is vast and dark
- ☐ D. All of the above

7. TTL exposure is affected by the focal length of the lens being used when taking fish pictures.

- ☐ A. True
- ☐ B. False

8. A TTL system compensates for exposure when a filter or an extension tube is used.

- ☐ A. True
- ☐ B. False

9. A TTL system compensates for exposure when the:

- ☐ A. Subject is of average reflectance and lighting is average
- ☐ B. Subject is bright and lighting is bright
- ☐ C. Subject and lighting are dark
- ☐ D. All of the above

10. A TTL system works well for:

- ☐ A. Front lighting
- ☐ B. Side lighting
- ☐ C. Backlighting
- ☐ D. All of the above

11. When using a TTL system, *automatic* exposure is bracketed by varying the:

- ☐ A. Power setting of the flash unit
- ☐ B. Film speed setting on the flash
- ☐ C. Film speed setting on the camera
- ☐ D. Any of the above

12. The f/stop selected with a TTL system is determined by:

- ☐ A. The depth of field desired
- ☐ B. The maximum subject distance
- ☐ C. The ambient light level
- ☐ D. All of the above

13. Lens settings between f/stops may be used with a TTL system.

- ☐ A. True
- ☐ B. False

14. Underwater TTL photography is possible with numerous flash units and the _____ amphibious camera.

- ☐ A. Nikonos IV
- ☐ B. Nikonos IV-A
- ☐ C. Nikonos V
- ☐ D. Nikonos V-A

15. The highest usable film speed with the Nikonos TTL system is ISO:

- ☐ A. 100
- ☐ B. 200
- ☐ C. 400
- ☐ D. None of the above

Scuba Quiz

Answers: TTL Photos

1. C. Reflected from the film in the camera. Light from the flash unit is reflected from a subject, passes through the lens of the camera and is measured by a sensor as it reflects off the film itself. Through-the-lens exposure sensing is also called off-the-film (OTF) exposure metering.

2. C. Duration of the flash. When the amount of light from the flash reflected from the film is sufficient for exposure, the camera signals the flash to stop emitting light. Note that if subjects are too far away, underexposure occurs even though the flash puts out all the light it can.

3. D. Makes all exposure adjustments automatically. TTL does not control ambient light exposure, so some lighting conditions can produce exposure errors. This second regulation of exposure can also be used to advantage because various effects can be obtained by combining the TTL and ambient exposure controls.

4. C. One foot and closer. The minimum distance for automatic control with normal lenses is one foot, but closer distances are possible when extension tubes are used. This is because the amount of light reaching the film is reduced with extension tubes.

5. D. All of the above. As indicated in previous answers, TTL photography has a maximum and a minimum range. Subjects need to be within this range and need to fill the central area of the picture for the optimum exposure. Since U/W photos are best when the subject distance is short, TTL lends itself well to the application in many instances.

6. D. All of the above. TTL is designed for subjects with average reflectance, so highly reflective subjects, such as shiny fish, produce exposure errors. If the background is more prominent than the subject, the light reflected from the subject will not accurately control the exposure.

7. A. True. Since the metering system in the camera measures the light from the central picture area and the picture area size is relative to the angle of coverage of the lens, the focal length of the lens does affect TTL exposure. However, when the subject fills the frame, e.g., a wall, exposure is not affected by lens focal length as long as the distance to the subject is within the automatic range of the TTL system.

8. A. True. TTL exposure metering measures the light actually reaching the film, so it can accurately compensate for any factors that affect the flash exposure within the automatic range (Nikon refers to this as the "coupling range") of the system.

9. A. Subject is of average reflectance and lighting is average. The ambient light exposure of a picture can produce overexposure in bright conditions because the ambient light overpowers the output of the flash. When photographing in dark conditions, overexposure can also result with some subjects because much of the light from the strobe is absorbed instead of being reflected.

10. D. All of the above. Another advantage of a TTL system is the photographer may move the flash around

the subject without having to recalculate the exposure for each angle. The TTL exposure may not produce the desired effect for some lighting angles, however, so exposures should be bracketed (see next answer) or the manual mode should be used.

11. C. Film speed setting on the camera. Ambient light exposure can be controlled with the aperture setting on the camera. By doubling the ISO setting, e.g., 100 to 200, the TTL exposure is reduced by one-half because the camera thinks the film is more sensitive to light. The opposite effect occurs when the ISO setting is halved.

12. D. All of the above. It has been noted that TTL has a range for automatic control and that the aperture setting affects ambient light exposure. It is also known that the f/stop affects the depth of field or range of focus. A very good feature of TTL photography is that an f/stop selected for a given distance can produce good results from one foot to the maximum distance for that f/stop. Manual photography requires a change of the f/stop when the distance changes.

13. A. True. By now you should understand this concept even though you may have answered the question incorrectly initially. The metering system measures the light from the flash that reaches the film, so it can definitely compensate for lens settings between normal f/stop adjustments.

14. C. Nikonos V. Automatic exposure control is possible with some systems that employ an external sensor, but true TTL photography requires a metering system within the camera itself and the Nikonos V is the only amphibious camera with this feature.

15. C. 400. The current limit for the range of control with a TTL system is an ISO setting of 400. High speed film is useful for dark lighting conditions, but it should be noted that TTL exposure reduction by increasing the ISO setting is not possible when 400 film is used. In this case, switch to the manual mode or use ISO 200 film to allow TTL exposure bracketing.

A through-the-lens exposure metering system is state of the art for underwater photography. It has certain limitations, but it can be very effective when understood and used within its limits. I hope your understanding of TTL photography has increased with this quiz. For some excellent information on Nikonos TTL photography, I recommend Jim and Cathy Church's new book, The Nikonos Handbook.

Results of CO₂ inflator survey: Many readers responded to the survey request included in the May 1986 Quiz on CO₂ inflators. Sixty-four percent of those responding felt the disadvantages of the devices outweighed the advantages, while 36 percent felt the opposite. Those in favor of CO₂ cartridges were generally of the opinion the security of an emergency inflation system was important. Those opposed to the devices cited specific accidents to support their views.

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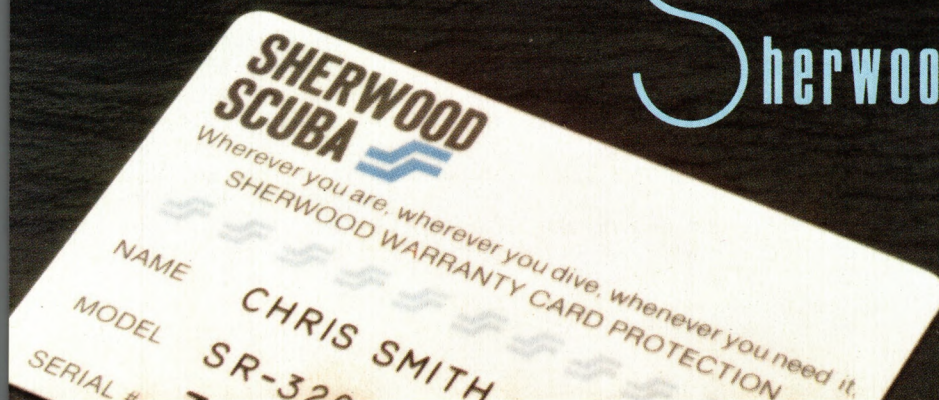
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Phantoms of the Fathoms—one of many presentations at Our World Underwater, Chicago—turned out to be exceptional as speakers dredged up ghost ships of long ago. Slide and film shows covered a potpourri of shipwrecks around the world—from treasure galleons to Great Lakes steamers.

Paul Ehorn, who has explored shipwrecks in all of the Great Lakes except Ontario, showed a film of the *John Osborn*, a wooden steam barge that sank off Whitefish Point, Lake Superior in 1884. First discovered by divers in 1984, the *Osborn* remains in superb condition. Her wooden hull is so well preserved (except for the starboard side where she was rammed) it appears as if the old ship could almost be salvaged to sail the lakes again. Even the name, painted on the bow, is distinct and protected by the cold waters of the queen of the Great Lakes.

The *Osborn*, a victim of a collision with the steel passenger steamer, *Alberta*, was heading for Marquette with a cargo

Five Provincial Park, Tobermory. A passing ship picked up the crew, preventing further tragedy.

Nicknamed the "corn wreck" because of her cargo—and the fact that fishermen were catching a variety of fat fish with corn stuffed bellies—the *Arabia* was found by divers in 1971. Orr showed the lack of deterioration on the wreck. She sits upright with her stern broken off but the rest of her is intact. The bowsprit sticks 35 feet off the front of the ship and the eight foot high anchor stocks, anchors still in place, are fascinating remnants. Slides clearly depict the remains of the corn cargo, the ship's wheel, a stove and a king post for carrying cargo. Ladders, rigging and broken masts lie scattered across the vessel that once sailed from the Great Lakes to England and back.

Rick Frehsee took the audience on an underwater tour, surveying Shipwrecks of the World. Starting in Florida, Frehsee showed some of the 35 steel hulled

reef, leaving a strange underwater sight. Three sets of locomotive wheels and axles, in addition to three carriages, rest in 15 feet of water surrounded by coral ridges that rise to the surface at low tide.

St. Thomas, Grand Cayman, Curacao, the British Virgin Islands and Martinique all have wrecks with intriguing backgrounds. The *Oro Verde*, off Seven Mile Beach, Grand Cayman, was a Panamanian cargo ship confiscated while smuggling drugs. She is 180 feet long, intact and tipped to her port side 50 feet deep.

Frehsee's slides of the *Rhone*, *Balboa*, *Superior Producer* and *Roraima* capture the romance and adventure of shipwreck diving. He ended with shots of the aircraft carrier, *USS Saratoga*, in the South Pacific and the *Andrea Doria*, south of Nantucket Island, Massachusetts.

Duncan Mathewson, marine archaeologist for Treasure Salvors, Inc., recounted the history of the *Atocha* and *Santa Margarita*, two treasure laden Spanish galleons discovered off Key West, Flori-



Wreck Facts

BY ELLSWORTH BOYD

of ore when a thick fog settled on the lake. Although both vessels sounded their whistles, neither could turn in time to avoid the tragedy that claimed four lives. Ehorn's film presentation showed divers exploring the 178 foot long wreck whose portholes, anchors, chains and chamber pots are still intact. Plates, saucers, utensils and the vessel's dinner bell are still on board the 546 ton ship.

Dan Orr, director of underwater education at Wright State University, Dayton, Ohio, dove on the 100th anniversary of the sinking of the *Arabia* in Georgian Bay, Tobermory, Ontario. A three masted barque, built in 1853 and lost in 1884, the *Arabia* foundered in a storm and sank in 108 feet of water in what is now Fathom

wrecks off the coast of the Sunshine State. One was exceptionally fascinating—the *Ice Fog*—in 125 feet of water. Captured with a wide angle lens, the whole vessel sits in the sand looking as if it's sailing the seas. Frehsee's tour took the audience to the Bahamas; Bimini, Spanish Wells, San Salvador and Grand Bahama Island. The latter is the location of Theo's Wreck, a 230 foot long steel cargo ship sunk in 100 feet of water, her stern resting near the ledge of a 5,000 foot drop-off.

Andros, Rum Cay, the Abacos and Eleuthera were next, all with their own special wrecks. Off Devil's Backbone, Eleuthera, a ship transporting a steam engine in the 1850s foundered on the



photo/Ellsworth Boyd

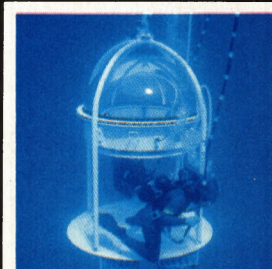
Duncan Mathewson

da. Since 1971 the search has extended over 100,000 linear miles and the history of both vessels has been painstakingly pieced together. Mathewson showed slides of the *Atocha* treasure, including piles of silver coins. Thirty-two chests of coins have been discovered, each weighing 150 to 175 pounds—containing 3,000-5,000 coins per chest. More than 100,000 coins have been cleaned, photographed and computerized, with 12 individual inventory characteristics assigned to each.

Mathewson showed some of the 1,200 silver ingots recovered from the wreck, one with a human bone attached to it. The audience was spellbound by pictures of gold bars, chains, silverware, swords, muskets, bronze cannons and an emerald cross—all part of the trail leading to the fabulous Mother Lode. Some of the gold was contraband cargo, smuggled aboard by the captain and crew and not listed on the ship's manifest. Ecclesiasti-

(Continued on Page 116)

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Photos by LARRY CUSHMAN

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Diving Medicine

BY ALFRED A. BOVE, M.D., Ph.D.

This month I have included several letters I sent to divers who inquired about personal medical problems. These concern common problems such as diabetes and medicines for hypertension and arthritis and uncommon problems such as artificial heart valves and artificial lenses in the eye.

DIABETES AND DIVING

The problem of diabetes and diving is a significant one and raises a number of concerns. The general feeling among diving medical experts is that diabetic patients who are insulin dependent shouldn't dive. The reason for this is that there is a real risk of a sudden hypoglycemic reaction with loss of consciousness. If this occurs underwater, there is a high likelihood of drowning. There have been cases of this occurring in diabetics and so the advice is generally to avoid diving.

There are diabetic divers: Although they have been advised against diving, they have been diving successfully to date. There is no way to be sure they will continue to dive safely.

In today's travel oriented diving, there is another consideration—that of having an adequate insulin supply in case of loss or emergency. When traveling, you should plan for a backup supply, especially if you go on extended trips where medical care is remote.

My advice to diabetics is do not dive. That is given because of concern for your safety and the safety of your diving partners. Also, you should be aware that there are diabetics who dive and that hypoglycemic reactions have caused serious accidents U/W.

COMMON MEDICATIONS

Dyazide and Naprosin are not known to cause problems in diving. If you are taking Dyazide for hypertension, be sure your blood pressure is under control before diving. Naprosin is an anti-inflammatory drug used for arthritis and gout. If your health is good otherwise, there is no contraindication to diving while using it.

ARTIFICIAL HEART VALVES

There are two problems in diving with an artificial heart valve. First, you

have demands for exercise and work imposed when you dive. This can occur when you have to carry scuba tanks, climb aboard a pitching boat, swim against currents and many other unpredictable contingencies. These require you to be in good physical condition before diving. I generally recommend undergoing a treadmill test to 13 mets. (Mets are a measure of work expenditure. One met is equivalent to the oxygen used by the body at rest). This workload seems to be about the level needed to be able to sport dive safely. If you can exercise at this level with normal blood pressure response, absence of severe shortness of breath, no heart irregularities and normal function of the aortic valve, then you can handle the exercise requirements of sport diving—not commercial or military diving.

A second consideration would be if you are taking Coumadin, an anticoagulant. The state of anticoagulation needed for normal function of your valve makes you more prone to bleeding problems from minor injuries and accidents. It is common in diving to sustain bruises and scratches even in the best of conditions. You will have to exert caution about injuries while diving to avoid excessive bleeding.

If you are in good condition and can exercise as noted above, then you should be able to dive safely in warm water, under good conditions. You should always plan your dives to avoid heavy physical exertion.

IMPLANTED LENSES

There are some divers who have had a lens replaced in their eye because of a cataract and are doing well in diving. There seems to be no problem with bubbles from decompression and there is no evidence the lens will take up enough inert gas to cause any trouble. There is some concern about infection in the surgical incision from water contact with the eye. This can be avoided by waiting until the incision is well healed before diving.

AGE

There are no advanced age related contraindications to diving. There is some concern about the physical stress of diving. Those of advanced age should be sure to avoid situations that require physical exertion beyond their capabilities. Also, older divers should have thorough physical examinations periodically to be sure they are able to exercise safely and without concern for heart problems.

Those in good health should be able to dive without problems as long as they stay within their limitations.

ROUND WINDOW RUPTURE

The consensus of most ENT physicians is that a round window rupture, once repaired, leaves the individual with a weakened round window and the recommendation is not to dive.

PREGNANCY AND DIVING

There is, at present, a consensus among diving trained physicians that pregnant women should not dive. A conference on Women in Diving was held by the Undersea Medical Society in May of this year. Information on pregnancy and diving will be available from this workshop when the proceedings are published within the next few months. For a copy of these contact the Undersea Medical Society: 9650 Rockville Pike, Bethesda, MD 20814.

To summarize the medical opinion prior to this recent workshop, we generally recommend pregnant women not dive because of concern for the health of the fetus. There are some studies that suggest it could be involved by decompression sickness and oxygen toxicity before the mother would be aware of any problem. Our recommendation is that women not resume diving until the pregnancy is over and a healthy baby has been delivered. This has been our recommendation for many years and I doubt it will change based on current information. The UMS workshop on Women in Diving will provide more information. >



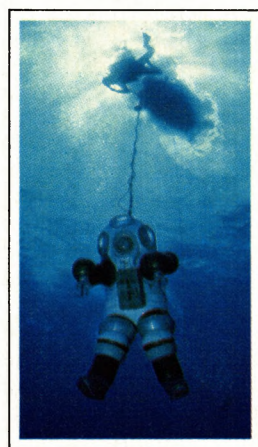
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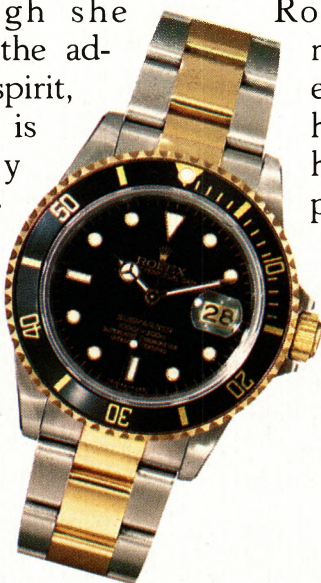


Confrontation with a Humphead Wrasse in the Red Sea.

not unexpected. Dr. Earle asks no less of her timepiece than she does of herself. Performance must be predictable in unpredictable circumstances. And high purpose must always be artfully executed. The accomplished make no compromise with excellence.



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THE GOURMET DIVER

THE ELUSIVE LOBSTER



TEXT AND PHOTOGRAPHY
BY BONNIE J. CARDONE

Far left, Sacramento diver Rick Garlick captured several large lobster on a trip to San Nicolas Island on the charter dive boat *Charisma*. This one weighed about ten pounds. Above: Delicious Lobster Diablo is a spicy, colorful way to prepare *Panulirus interruptus*.

It's insanity, really. I mean, this is a rather large relative of the *cockroach* we're talking about! Still, I dedicate several boat trips and a considerable sum of money to the pursuit of these crafty crustaceans. I make the first dive of the day (quite a sacrifice for a charter member of the Ten O'Clock Club); leave my cameras topside (an unbelievable sacrifice—what if a gray whale happens by); and try not to complain about the cold water too much. These facts should prove that I'm serious or—perhaps—seriously suffering from Southern California Bug Fever.

It would be cheaper and easier to spend that money on several meals in the best restaurants in town. Then I wouldn't have to brave the cold and Lord knows there are productive things I could do with all that time. But, few things can compare to the exhilaration of finding and capturing a monster crustacean. And, even the best restaurant lobster cannot begin to compare in taste with those you have personally caught and cooked.

In Southern California, lobster season opens the first Wednesday in October and closes the first Wednesday after the 15th of March. If you intend to participate, and are more than 16 years old, you must have a California Fish and Game ocean fishing license. These can be bought at sporting goods stores and many landings from which charter dive boats depart. Licenses are available for both residents and non residents. Underwater, you must also carry a gauge for measuring your catch and, although you may come to the surface to do this, you may not bring shorts ashore or aboard a boat.

Generally, *Panulirus interruptus*, the

spiny lobster, lives in rocky crevices and caves. I have found locating them is the easy part. The hard part is grabbing and bagging them. He/she who hesitates is lost. Don't think about it, do it, is the best advice I can give you. Go for the "horns" at the base of the antennae or for the body, just behind the head. Don't grab the antennae or the legs unless that's all you want of the critter. These appendages break off easily, allowing the bug to escape and leaving you with just a few hors d'oeuvres.

If a lobster seems to be wedged into its lair, alternating pushing with pulling will

often dislodge it. Lairs sometimes have backdoors. A friend of mine, Connie, confounded her 11½ pounder with a stalk of kelp. To avoid being hit with it, the bug walked out the front entrance and into her waiting arms. While this was perfectly legal, the law says you may not use any hand operated appliance or hooked device while lobster diving.

With bug in hand you would think bagging would be easy—not so! Elaine's 12 pounder cleverly wrapped its legs around her goodie bag and she ended up having to hold onto it as best she could while swimming back to the boat and getting

LOBSTER DIABLO

- 4 T butter
- 1 medium onion, finely chopped
- 1 clove garlic, finely chopped
- 2 C bell peppers, finely chopped (use mixture of red, green and yellow)
- 2 C lobster meat, chunked (keep the shells)
- 1 C bread crumbs
- Black pepper, ground
- Salt
- Mustard
- Cayenne pepper, dash
- Butter
- Parmesan cheese, grated


Preheat oven to 400°F. Melt butter in skillet and saute onion, garlic and peppers until tender. Season to taste with black pepper, salt, mustard and cayenne. Combine with one-half cup bread crumbs and lobster meat. Fill lobster tail(s) with mixture and dot with butter. Bake for 15 minutes. Sprinkle with par-

mesan cheese and bake 5 minutes more, or until nicely browned. This dish tastes good hot or cold.

LOBSTER CALIFORNIA SUR

- 3 bell peppers, finely chopped (use mixture of green, red, yellow)
- 2 T onion, chopped
- ¼ C olive oil
- 2 tomatoes, peeled, seeded and chopped
- ½ C white wine
- 2 tsp. chili powder
- Salt
- Black pepper, ground
- 1 pound lobster meat, chunked

Saute peppers and onions in olive oil until soft. Add tomatoes, wine, chili powder, salt and pepper to taste. Cover and cook over low heat for 25 minutes. Add the lobster meat and cook for another 10 minutes. Serve with rice or over pasta.

A man and a woman are smiling and embracing each other. They are wearing dark blue wetsuits with bright, multi-colored stripes (pink, white, and purple) along the sleeves and sides. The woman is on the left, and the man is on the right. The background is dark.

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ELUSIVE LOBSTER

on board. All of this was accomplished in eight foot swells. She made it, but no one is quite sure how.

A word of warning: Don't bag your bugs head first: They swim backward by flapping their tails. A headfirst descent into a goodie bag is very likely to turn into an artful escape.

In Southern California the limit is seven bugs per day. Some boats have baitwells that make keeping them alive and healthy easy. You simply bring an extra goodie bag and a rope with a clip on the end. Lower the bag into the baitwell with the rope. On other boats, you will have to hang your catch overboard with a rope while at anchor. On the ride home, cover the bugs with burlap bags and wet them down frequently. Or, keep them in a salt-water filled bucket. Lobster meat spoils quickly, so you'd be wise to keep your catch alive. Since Fish and Game laws do not allow de-tailing of lobster, do not separate the tails until you get home.

Lobster are nocturnal and feed when the sun goes down, so night diving is an especially good way to find them out in the open. It is amazing how many bugs appear—in places you were sure there were none—in the evening.

Although some people freeze lobster whole, my bio-chemist friends have convinced me this is risky. Even in the freezer, the nonedible parts may contaminate the edible parts. I prefer to cut off the tail. Then I remove the intestinal vein by slitting the underside of the tail with a sharp knife and pulling the vein out. Some insist upon cooking the meat before freezing, I freeze my lobster raw.

Lobster recipes abound. Included here are two colorful, spicy recipes that are uncommonly tasty. They look great, too, and are very easy to prepare. Happy hunting and eating! 🦞

PADI PHOTO CONTEST

October 31 is the deadline for PADI's Eighth Annual Underwater Photo Competition. This year's winners will receive a Nikonos V camera system and a week's vacation for two at Anse Chastanet resort, a PADI Five Star Training Facility in St. Lucia.

The contest is open to all amateur underwater photographers and entrants can register at a participating PADI training facility. In addition to the grand prize winner, there will be 11 regional winners. All winners will have their photos published in upcoming issues of SKIN DIVER, The Undersea Journal and Diving Ventures.

Complete contest rules and information are available from participating PADI training facilities. 🦞

MISTRAL BC RECALL

U.S. Divers is recalling all of its Mistral buoyancy compensators (model numbers 7625-00, 7625-09 and 7625-10). The Mistral has been marketed nationwide since May 1986.

A potentially hazardous problem may exist with the bladder of the Mistral that might make it difficult or impossible for the diver to maintain desired buoyancy.

The model name Mistral appears on the lower right hand pocket of the BC. Only Mistral buoyancy compensators are being recalled. The bladders within the Mistral were manufactured in Japan and were not used in any other BCs in the U.S. Divers product line.

Consumers are warned not to dive with the Mistral and are requested to return the BC directly to U.S. Divers for a no charge replacement with a new black and yellow Calypso of greater retail value. For additional information call collect (714) 540-8010. 🦞

SCUBA LIFE SAVING

Scuba Life Saving, by Albert Pierce, which was reviewed in the February SDM, is now available from Leisure Press (a division of Human Kinetics Publishers, Inc.). The 192 page paperback also has a new cover. The price is still \$14.95. Contact Leisure Press, P.O. Box 5076, Champaign, IL 61820. 🦞

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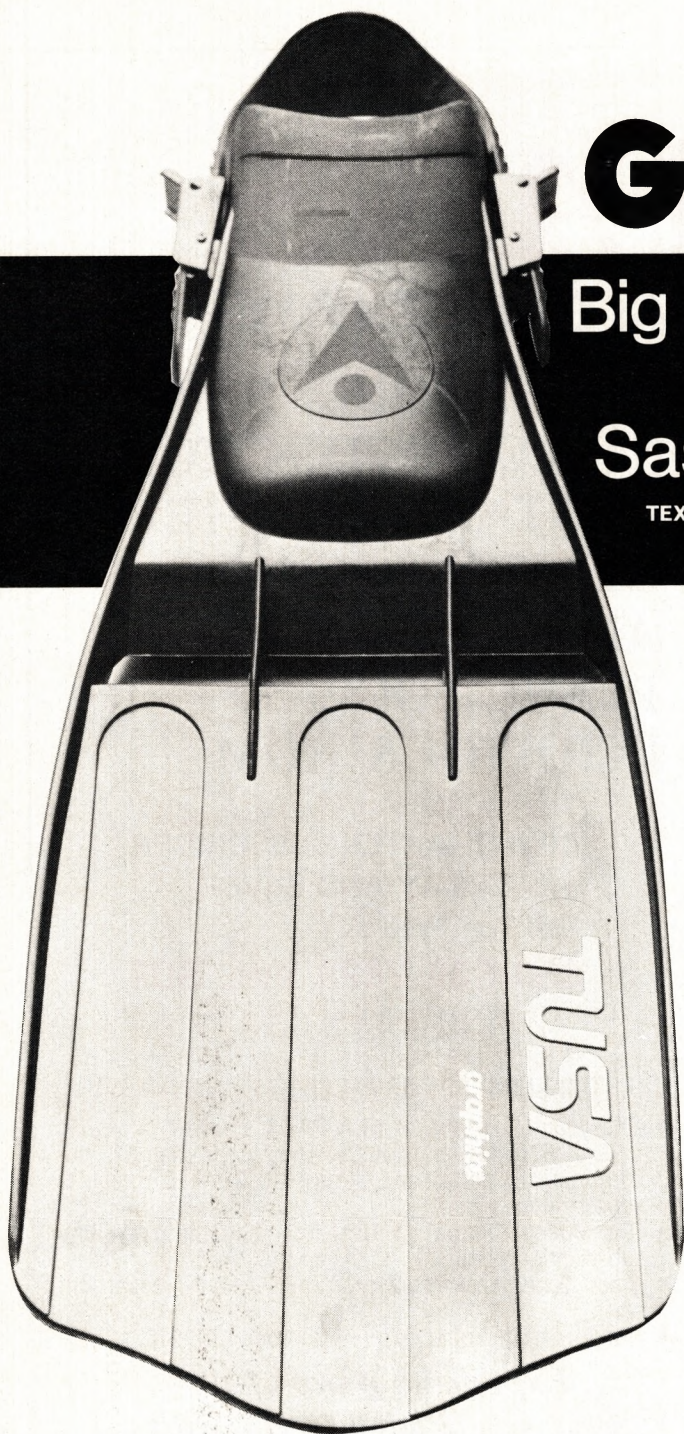
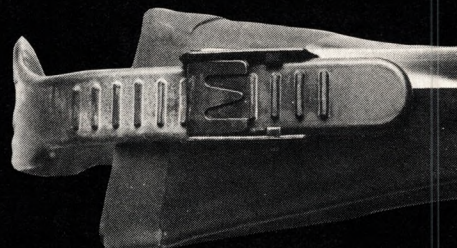
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TABATA GRAPHITE FIN

Big Enough To Fit Sasquatch

TEXT AND PHOTOGRAPHY
BY ERIC HANAUER



Tabata, the company that brought high fashion color to the diving industry, has just introduced a fin in basic black. No this isn't a throwback to Neanderthal times, when wetsuits and diving accessories were about as colorful as the original Model T. Instead, this is a move from the world of high fashion to that of high-tech: a graphite fin made for the big kicker.

Last year, Tabata introduced a new line of fins, color coordinated with their masks, snorkels and regulators. The vented blades were made of clear, low density polyethylene. Foot pockets, straps and logos were in the same brilliant colors as the other Tabata gear. This marked the first time anyone had come out with such a wide range of colors in fins. They included yellow, blue, pink, lavender, fluorescent orange and fluorescent green. In addition, they featured an innovative buckle that was far easier to adjust than that of their competitors.

Yet, something was missing. There was no fin for the big kicker, the larger diver with powerful legs who preferred a stiffer fin for increased power. That need has been met in 1986 with the introduction of two new fins by Tabata: the Graphite Fin and the Maxi Graphite. The only difference is in size; the foot pocket and the blade of the Maxi Graphite are ten percent larger than those of its standard sized twin. (It is not available in a small size at this time.)


The advantage of graphite in plastic fins has been well documented. It makes the fin stiffer, giving it more strength and snap. Graphite is used in such things as golf clubs and tennis rackets for the same purpose. In our test dives, performance of the Tabata fin was comparable with that of other graphite fins on the market. But this fin offers a couple of advantages that set it apart.

The first is a large, generous sized foot pocket that would fit Sasquatch. It easily swallowed my size 11 triple Es with one-quarter inch booties. Furthermore, the plastic material covers two-thirds of the foot pocket. This overcomes one of the major drawbacks of plastic fins: the tendency of the softer material to sag on repeated exposure to warm temperatures. Most manufacturers recommend that the plastic "shoe trees," packed with the fins, be inserted anytime they aren't on your feet. Tabata's Larry Hagebusch said that the ones that come with the Graphite fins can be thrown away, because sagging doesn't occur with them.

The other advantage is a unique buckle system that makes strap adjustment a snap. This consists of an all-plastic buckle, through which the strap is fed. To lock it, merely pull back on the strap while closing the buckle with your thumb. To open, just pull on the end of the strap. It is a positive lock that won't slip, even if the strap has just been treated with silicone.

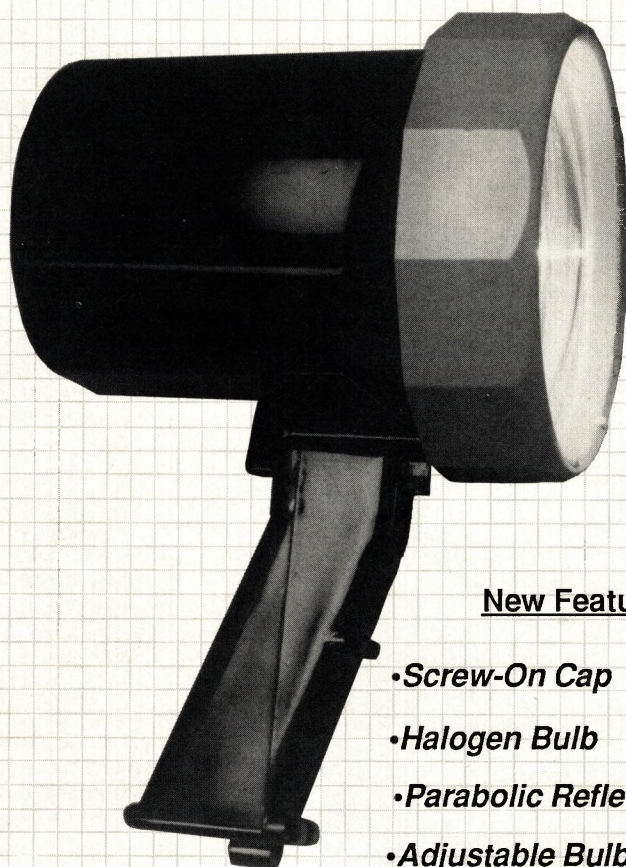
A pair of small plastic tabs in front of the buckle keep the end of the strap from sticking out. Don't forget to place the strap underneath them after adjustments have been made. Tabata recommends the buckles be released after each dive. This relieves stress on the rubber and will increase the life of the strap. Do you remember how old straps used to dry out and crack where they were woven through the buckles and how they always seemed to break at the most inopportune moment? That shouldn't be a problem with the Tabata fins.

The only thing missing in this well designed fin is a drainhole for the foot pocket. If it were mine, I would make a couple of small, concealed holes in the bottom, under the toes.

Although Tabata's graphite fins were designed in Japan for a worldwide market, the foot pockets were constructed to measurements made on U.S. Air Force personnel stationed near the factory. In the United States, the fins bear the Tusa logo, which stands for Tabata USA. Retail price is \$70 for either size, \$10 more than the non-graphite fins. If power is a higher priority for you than color, check these out at your dive store. 

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SDM's U/W Photo Class

Mastering Wide Angle

TEXT AND PHOTOGRAPHY BY JIM AND CATHY CHURCH

Page through a few issues of SDM and look at the pictures in both the editorial and advertising. Notice how many U/W pictures show two or more entire divers, large portions of shipwrecks or wide scenic views. The only way to take such pictures is with a wide angle lens. You can't duplicate them with a 35mm lens.

WIDE ANGLE LENSES GET YOU CLOSE

The major advantage of a wide angle lens is that it allows you to photograph large subjects relatively close. Reducing camera to subject distance is important because this also reduces the amount of water (and suspended particles) you must photograph through. Suspended particles block the camera's view of the subject and block and scatter light rays. Thus, for sharp images with good contrast between the light and dark areas, you must get close to your subjects.

Getting closer also makes your pictures more colorful. As light from both sun and strobe pass through the water, the warmer colors are absorbed; the greater the distance, the greater the loss of color. This color loss continues through the total light path from strobe to subject and back from subject to camera. For more colorful pictures, minimize the distance light must travel through water.

COMPOSE IN THE VIEWFINDER

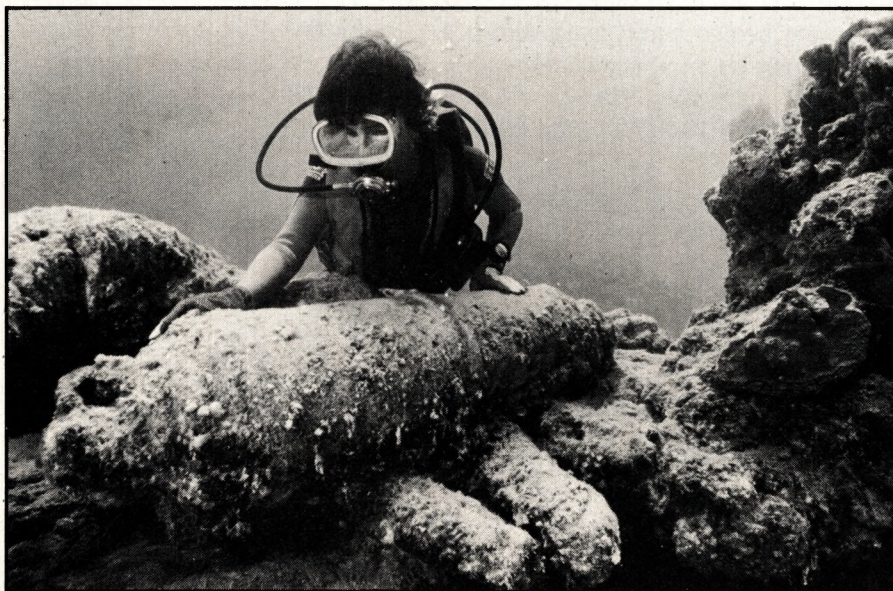
The most common error beginning wide angle photographers make is to compose by eye while looking over the

top of the viewfinder and then using it as a gun sight to aim the camera.

Your eye sees the scene with about the same narrow perspective as a 50mm lens, whereas your wide angle lens sees a much wider view. Thus, if you compose by eye and use the viewfinder only to aim the camera, you will be too far away from your subject. If you've already been taking wide angle pictures, you may have noticed the divers shown in your pictures seem to be much smaller and farther away than you remembered.

If you use the center of the viewfinder as a gun sight to aim the camera, you will often see fins, heads and other distracting subjects in the corners of the picture. To compose with the same perspective the lens sees, you must compose the picture in the viewfinder! Look at each corner rather than just the center.

The viewfinder itself can cause composition problems. Because some viewfinders show a smaller picture area than will be photographed (about 85 or 90 percent) the images on film will be smaller than they appear in the viewfinder. Therefore, take some test pictures noting what subject areas are near the borders of the picture as shown in the viewfinder. Then, see the differences on the processed film. Once you have a feeling for the correct picture area, your composition will



Wide angle silhouettes can be taken with level camera angles—as with this diver framed in the opening of a wreck. The contrast between light and dark areas is most important. Left: Cathy Church examines an old cannon on Anegada Reef, British Virgin Islands. This portrait was taken with a wide angle lens from a distance of about three feet. When you use a wide angle lens, you must compose the picture through the viewfinder—otherwise, subjects can be too small in the photo and extraneous objects can intrude at the borders.



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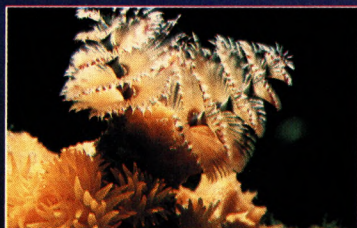
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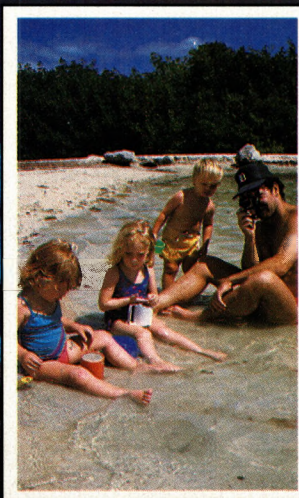
With a full range of manual shutter speeds at your command, you have the ability to make the exposure *you* want. You can compensate for backlighting, overcome difficult conditions, take advantage of unusual situations.

Example: This shot made at 1/60 sec., f8 and top lighting with the SB102 at manual 1/4 power. Creative control is in your hands.



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quickly improve, as will your photos.

LIGHTING

While a normal beam strobe can be used to highlight selected subject areas, such as a diver's face and chest, a wide beam strobe is best for wide angle photography. One technique is to use sunlight for the basic exposure and use a wide beam strobe for fill lighting to accent color and detail in the near subject areas.

If you hold the camera in the normal (horizontal format) position with an approximately level angle, the basic technique is to light from above. Hold the arm so the strobe is high above and a little in front of the camera and aimed downward and outward at the subject. This position allows the light to fall relatively evenly from a natural angle. Don't hold the strobe at your upper left (as you would with a 35 or 28mm lens). Backscatter (from light hitting suspended particles) or even the front of the strobe could appear in the upper left corner of your wide angle picture. If you tilt the camera on its side for the vertical format, light from the side with a slightly downward angle.

THREE BASIC PICTURES

Here are three basic wide angle pictures to get you started: the portrait, the silhouette and the scenic.

1. The portrait is usually taken at about three apparent feet or less and features a diver relating to marine life. Use an aperture that underexposes the midwater background by at least one-half stop and base your strobe exposure on the most reflective areas such as exposed skin.

2. The silhouette usually features an upward camera angle, although divers may be silhouetted in tunnel mouths or under archways with level camera angles. Silhouettes are often taken with sunlight alone with the contrast between the

CHECKING YOUR UNDERSTANDING

Problem: Using your new wide angle lens, you took several pictures of an angelfish at distances of about three or four feet. In your pictures, the angelfish is much too small. What is wrong and what should you do?

Solution: Wide angle lenses are for photographing large subjects, not small subjects at such long distances. If you want to photograph angelfish with a wide angle lens, you must get closer than about two feet. Also, you used the viewfinder just to aim the camera—compose in the viewfinder!

Problem: You can see the bright flare of backscatter from strobe light striking suspended particles in the upper left corner of your horizontal wide angle pictures. What is wrong and what should you do?

Solution: You were holding the strobe in the upper left as if you were using a normal angle lens. Hold the strobe above the camera, not to the left.

The major advantage of a wide angle lens is that it allows you to get in close to your subject and thereby reduce the amount of suspended particles between the lens and subject. This increases image sharpness.

SELF ASSIGNMENT

Select one of the three basic wide angle shots: portrait, silhouette or scenic. Devote an entire dive and a roll of film to the one basic shot. If your buddy is posing for you, diagram basic shots with stick figure sketches and agree on hand signals. Use both vertical and horizontal formats and different distances and camera angles. Critique the pictures with your buddy and decide how you could improve them. Then, repeat the assignment. The improvement will be amazing!

dark and light areas being more important than color.


3. Scenics can show a diver, a group of fish or near subject with a broad expanse of seascape in the background. Or, a scenic may emphasize near seascape with divers in the background. The basic exposure is for sunlight. The strobe lighting, about one-half stop weaker than sunlight, provides fill lighting to enhance detail and color in the near subjects.

TAKING THE PICTURE

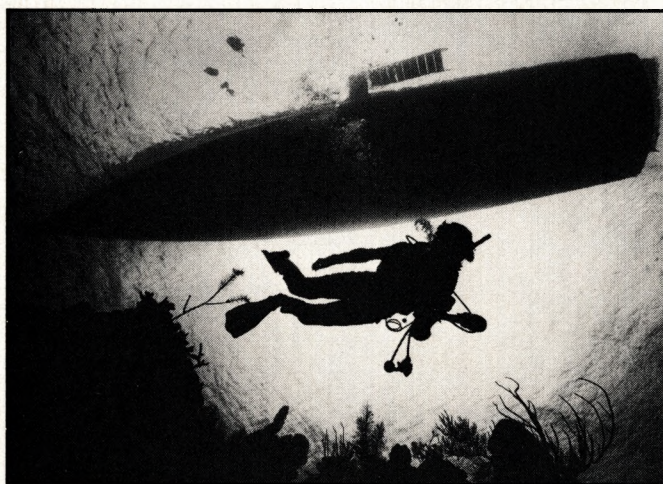
While the exact steps may vary with different subjects and lighting conditions, the basic steps are as follows:

1. Select a subject—if working with a model discuss the pose ahead of time.
2. Check all basic camera settings and turn on the strobe.
3. Tentatively compose the picture in the viewfinder.
4. Adjust aperture for the desired amount of sunlight exposure.
5. Adjust strobe power setting or distance for the desired balance between sunlight and strobe light.
6. Set the focus on the camera and note the depth of field.
7. Hold your flash at the desired angle.
8. Fine tune your composition in the camera's viewfinder.
9. Take the picture.

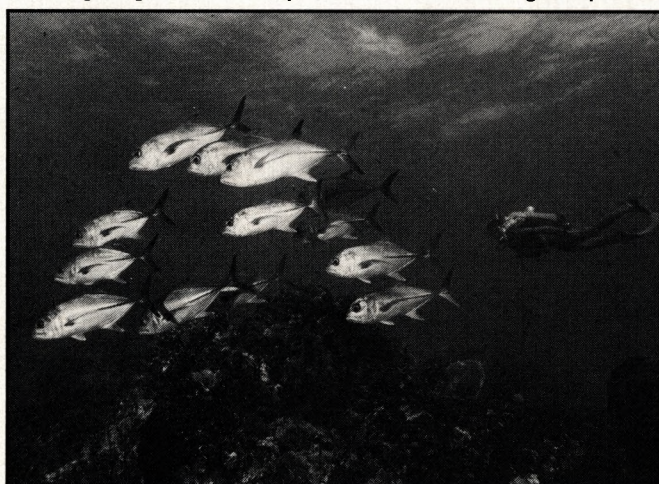
WIDE ANGLE PERSPECTIVE

Wide angle lenses make near subjects appear larger than normal and make far subjects appear smaller than normal. Thus, a large fish that is closer to the camera than a background diver will appear to be even larger. You can also use wide angle perspective to make small crevices appear to be much larger. Simply frame a distant diver with a small crevice that is close to the wide angle lens. 

Wide angle silhouettes are often taken with upward camera angles to accent the subjects against the bright surface. Here, in clear water, a diver, reef and boat are all part of the silhouette.



Wide angle scenics can show divers and fish with a broad expanse of seascape in the background. The strobe is used only as fill lighting—one-half stop weaker than the sunlight exposure.





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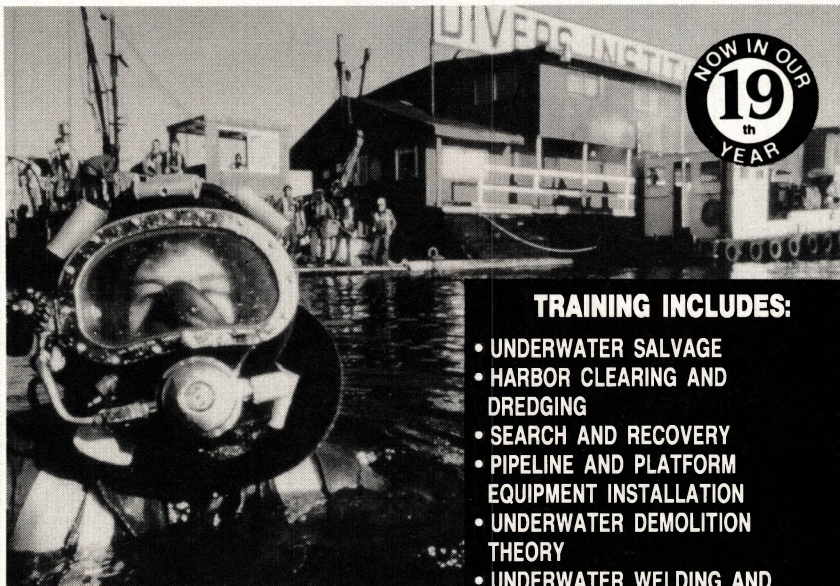
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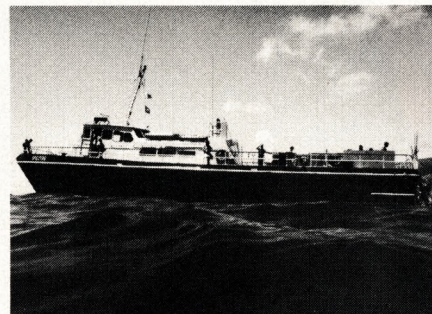
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NEW CA DIVE BOAT

Southern California has a new dive boat, the *Spectre*. The owner/skipper, Dave Melson, however, is not new to the dive scene, he has been running charter boats for many years.

A former offshore oil crew boat, the *Spectre* is 85 feet long with a 19 foot beam. She has a completely enclosed



galley, which will seat 24 people and provides hot meals and cold drinks. She's all aluminum and fast.

Remodeled especially for divers, the *Spectre* has plenty of deck space for gearing up. There are benches with individual storage areas to keep equipment out of the way yet convenient. Twin ladders provide easy boarding from the ramp at the stern. There are two compressors that supply air fills up to 2,250 psi. The two heads contain hot freshwater showers. Four cabins with double bunks and a bunkroom sleep 30.

The *Spectre* is docked at Cisco's Landing, 4151 Victoria Avenue, Channel Islands Harbor. For more information contact Melson Charter Service, P.O. Box 1406, San Pedro, CA 90733 or call (213) 833-1577; (818) 764-1183.

GARVEY/POSEIDON

Mitchell Garvey has been appointed Great Lakes representative for Posdive, Inc., servicing dive shops on behalf of Poseidon diving equipment. A certified diver and instructor, he has experience in retail sales and manufacturer representation. He covers Ohio, Michigan, Indiana, Illinois, Wisconsin and Minnesota.

Poseidon's North American distributor—Posdive, Inc., 322 Main St., Port Washington, NY; (516) 944-5333—is managed by Craig Jennings.

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DeCLARIS

Silver and black, custom adjusted, body hugging and rugged—when I donned the Dacor HTS Seachute BC, snapping in buckles and snugging up straps, I was reminded of Lee Marvin in *Cat Ballou* as the silver haired gunman dressing for his last shootout. His well fitting gear seemed to uplift him. You could tell it felt good. It was the same with the BC jacket: It was padded where necessary, snug where necessary and open where necessary.

The Dacor HTS (Hi-Tech Stabilizing) Deluxe Seachute BC incorporates an inner bladder of polyurethane and a tough Cordura nylon exterior. The inner bladder is sculpted and baffled to hug the body closely, reducing drag underwater and increasing comfort. The jacket features the popular snap-in shoulder design. This positions the largest amount of flotation low on the diver's body, which floats him/her vertical on the surface and horizontal underwater. The shoulder area is left open for comfort and easy access to chest mounted drysuit valves and the shoulders have built-in padding for comfort. Sewn-on plastic inserts reinforce each shoulder. The snap-in shoulders also allow easy donning and doffing and quick adjustment. To tighten the straps, simply pull down on the large plastic D-rings attached. To loosen the straps, just push up on the bottom of the buckles.

Other adjustments on the HTS BC include a snap-in chest strap and a padded, Velcro® closing waistband. Topside, the waistband supports the weight of the tank on the hips instead of the shoulders. This greatly increases comfort and saves wear on the shoulders of the jacket.

The waistband passes through six sewn on nylon webbing loops around the inner circumference of the jacket and attaches to the backpack with another strap. Two stainless D-rings are attached to waistband guides. Thus, the weight of gear such as goodie bags is supported by the waistband instead of the jacket.

The HTS BC comes with a plastic backpack that incorporates a curved tank supporting brace and a nylon band. The adjustable band closes with a plastic snap-over buckle and is secured with a Velcro tab. A rubber sheath around the band helps prevent the tank from slipping. Because the band is collapsible, the BC/backpack takes up less space in a gear bag. A sturdy nylon carrying strap is attached to the top of the backpack.

One of the unique features of the HTS BC is a cushion that attaches (by Velcro) to the backpack on the diver side. The combination of the waistband and the cushion pads the backpack from top to bottom, completely shielding the diver from it. This padding, combined with the variety of adjustments, makes the HTS BC fit like your favorite coat.


The jacket has built-in mesh drainage panels as do the two large pockets. The

pocket on the diver's right closes with a Velcro flap and, through rearranging the Velcro tabs, can be set up to hold an extra second stage. In this orientation an orange tab is displayed that will guide your out of air buddy to the octopus.

The other pocket closes with a plastic zipper. The tab has a large ring attached so your gloved fingers can find it underwater. Inside this pocket is a sewn-in plastic key clip and the pocket covers the CO₂ mechanism (optional). There is a Velcro closing hose guide just above this pocket and another on the right shoulder.

The jacket has a combination oral/power inflator mechanism built into a cor-

rugated hose attached to the left shoulder. Pulling down on this hose will dump air from the BC. An overpressure relief valve is on the right shoulder and it doubles as a quick dump.

The HTS Seachute BC jacket is available in sizes small through extra large in blue/yellow, pink/turquoise or silver/black (with red piping) to color coordinate with Dacor's Divecolors series of masks, snorkels and wetsuits. Suggested retail for all sizes is \$386.50 with the CO₂ mechanism and \$374 without. It even comes with a whistle. Strap one on at your Dacor dealer. It could be an uplifting experience. 

DACOR HTS SEACHUTE BC

BY JIM WALKER



photos/Bonnie J. Cardone



Dacor's HTS BC features a zippered pocket and a wide spine pad (left) that attaches to the backpack. A variety of adjustments allow a custom fit.

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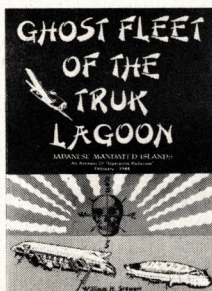
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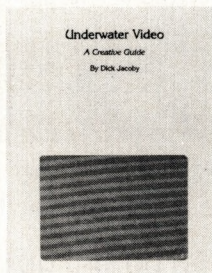
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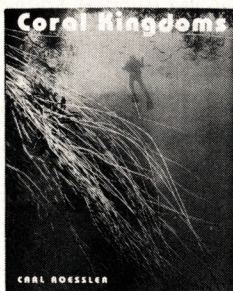
Divers Bookshelf



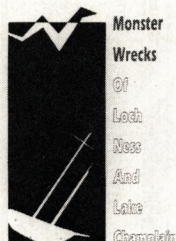
Ghost Fleet of the Truk Lagoon—By William H. Stewart, this book is an account of the U.S. Navy's attack on the Japanese fleet in Truk Lagoon in February, 1944. \$11.50. Pictorial Histories Publishing Company, 713 South Third West, Missoula, Montana 59801.



Underwater Video—By Dick Jacoby, this book covers video selection, artificial light, getting ready, focus and color, the shoot and production. Includes a glossary of terms. \$14.95 plus \$2 shipping. The Creative Whale, 6676 N. Northwest Highway, Chicago, IL 60631.

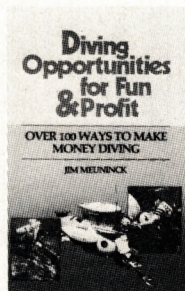


Coral Kingdoms—By Carl Roessler, this coffee table type book is full of his colorful underwater photos of marine animals from around the world. The book discusses the animals and where the best diving is found. \$35. Harry Abrams, Inc., 100 Fifth Ave., New York, NY 10011.

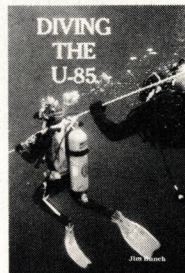


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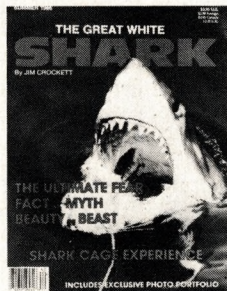
Monster Wrecks of Loch Ness and Lake Champlain—Written by Joseph W. Zarzynski, this book discusses airplane and shipwrecks, archaeological sites and apparitions in these two lakes. \$8.95 plus \$1 shipping. M-Z Information, P.O. Box 2129, Wilton, New York 12866.



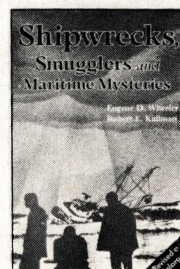
Diving Opportunities for Fun & Profit—This book by Jim Meuninck discusses U/W harvesting, wreck salvage, gold diving, police and fire services and more. Many photos and illustrations. \$9.50. Media Methods, 24097 North Shore Drive, Edwardsburg, Michigan 49112.



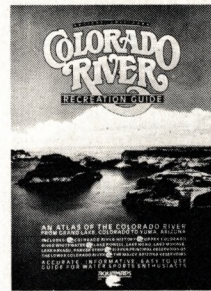
Diving the U-85—By Jim Bunch, this book is a pictorial guide to diving on the wreck of this WW II German submarine. Wartime photos and correspondence are included. The sub's history is told. \$9.95 plus \$2 shipping. Deep Sea Press, P.O. Box 48, Kitty Hawk, NC 27949.



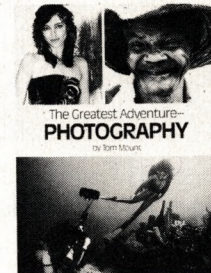
The Great White Shark—By Jim Crockett, this magazine-style book is full of photos of great white sharks in action. The animal's history, habits and myths are explored as is the danger it poses to man. \$3.95 plus \$1 shipping. NLP, Inc., P.O. Box 21447, Reno, Nevada 89515.



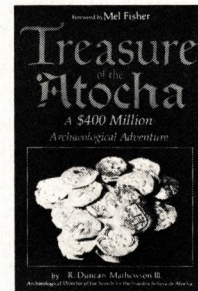
Shipwrecks, Smugglers and Maritime Mysteries—By Eugene D. Wheeler and Robert E. Kallman, this book discusses maritime events and shipwrecks in Southern California's Santa Barbara Channel. \$8.95. Pathfinder Pub., 458 Dorothy Ave., Ventura, CA 93003.



Colorado River Recreation Guide—This publication is a guide to the Colorado River and major reservoirs in Arizona. It includes detailed maps and a wealth of watersports related tourist information. \$15.95. From Aquamaps, P.O. Box 417, Denver, Colorado 80201.



The Greatest Adventure—Photography—Tom Mount's book discusses photo techniques above and U/W including close-ups, wide angle, telephoto and more. \$24.95 + \$1.50 shipping (FL res. add 5% tax) Sea-Mount Pub., 1545 NE 104 St., Miami Shores, FL 33138.

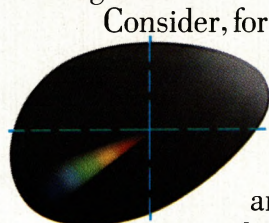


Treasure of the Atocha—With a foreword by Mel Fisher, this book by R. Duncan Mathewson III, archaeological director for Treasure Salvors, Inc., is the story of the 16 year search for this famous treasure galleon. \$24.95. Pisces Books, One School St., Glen Cove, NY 11542.

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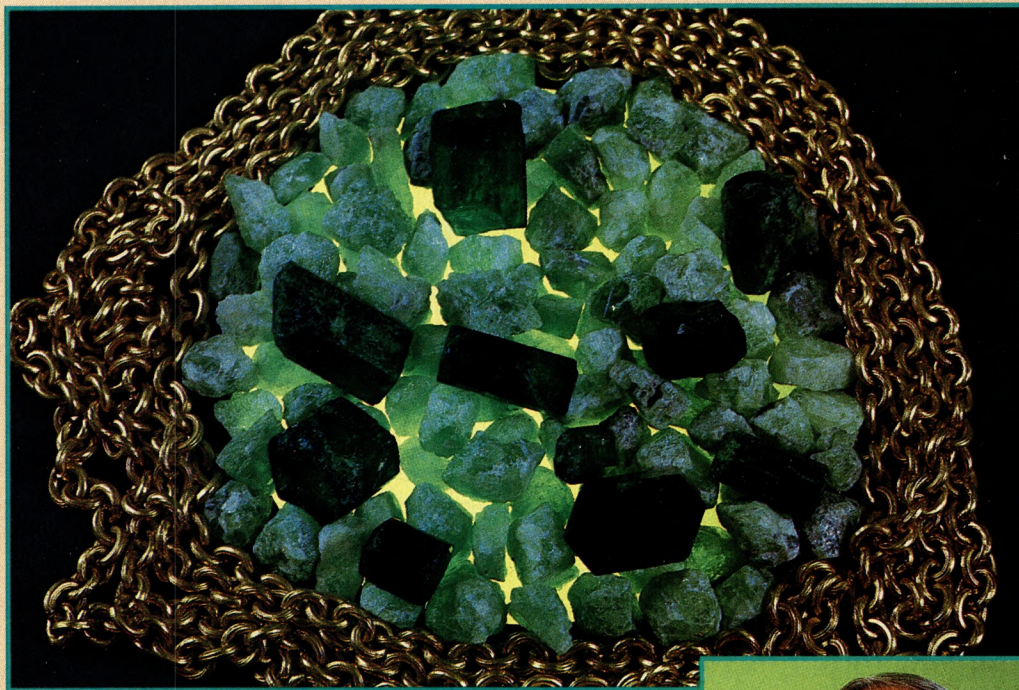
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JEWELS of the Atocha

TEXT AND
PHOTOGRAPHY
BY STEVE LUCAS



Green fire: When you hold them to the sun, that's what they produce, a green blaze. They don't sparkle, they hardly shine. Instead, they glow with the intense color that names them—emerald.

Beside me, Sam Davison was grinning broadly. The president of Dacor, he, ad executive Bill Goldman and I were at Key West's Treasure Salvors Museum to photograph the treasures of the sunken Spanish galleon *Atocha* and see the detailed workings of its large, privately funded archaeological research department. We were being allowed to experience the rare opportunity of touching some of the world's most important 17th century Spanish treasures. The next day we were going to dive on the site of Spain's most celebrated treasure wreck. Fully prepared to see tons of gold and silver, we had not anticipated the emeralds.

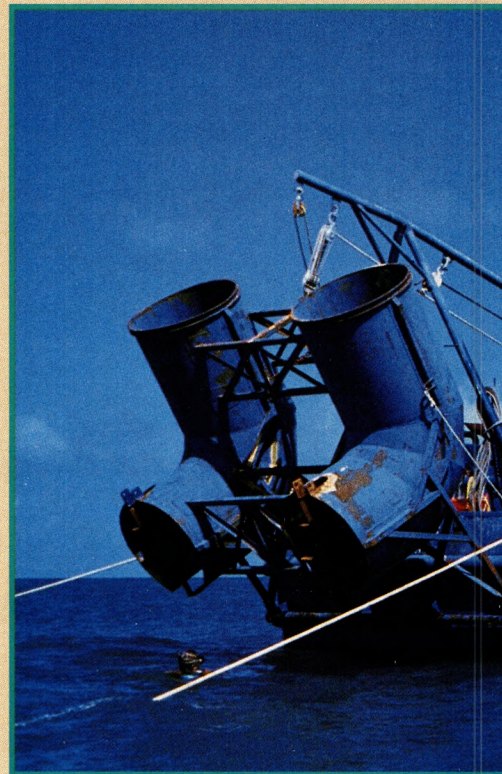
In his hands, Sam held two plastic bags. Each contained a single hexagonal green crystal. One weighed 77-plus carats, the other, 40. Combined, the uncut emeralds' stone value has been estimated to be as much as \$3 million with the majority of the value, surprisingly, going to the smaller stone owing to its un-

sual clarity! Taking into consideration their historical value, the total worth could be as much as five times that amount.

These were world class gems, some of the rarest in existence and definitely among the most valuable in the United States. More than 80 others had already been placed in individual plastic bags, each bearing an identification tag that, when compared to a detailed computer printout, told its weight, date of discovery and location on the enormous wreck site—accurate to within three feet!

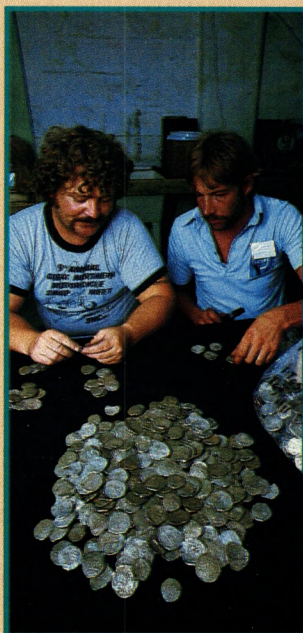
When Fisher found the main pile—his mother lode—the world was immediately aware of the discovery. Almost every major news magazine ran stories about his 16 year search—filled with mystery, triumph, joy and tragedy—that had finally paid off.

With 40 tons of precious metals aboard, the badly overloaded *Nuestra Senora de Atocha* had sailed from Havana for Spain on September 4, 1622. Two days later she sank in a vicious hurricane near the Marquesas Islands west of Key West, Florida. Other than the vain attempts of Spanish salvors, she would not be seen again until July 20, 1985. On





Opposite page: Emerald cross, loose emeralds, Mel Fisher. Bottom: *Dacor Diver* and *Magruder*. Clockwise from left: Mel Fisher and Dacor's Sam Davison; Vince Trotta; Sean McKinney and Bruce Stephenson; Kathleen Garvin; Bill Goldman, Mel Fisher, Sam Davison.



that date, Treasure Salvors' divers Andy Matroci and Greg Wareham swam almost 50 feet down to check out a strong reading from their electronic search equipment. On the bottom they saw silver bars stacked exactly the way a television movie maker would imagine them. Lobster antennae waved from the cracks of the underwater "silver condo." Cardboard-like, but still recognizably intact, wooden chests were buried in the sand. Most contained millions of dollars worth of blackened silver coins, others a king's fortune in still shining bars of pure gold. Fishing line was entwined in the riches, a spear shaft lay on the sand not far away. Someone, perhaps many, had come within yards of unbelievable wealth without ever knowing it!

Mel and his divers knew almost precisely what they would be bringing to the surface. Her cargo was by now well known—or so they thought. Thousands of pages of Spanish documents had been found in the Archives of the Indies in Seville, Spain by Treasure Salvors' chief historical researcher, Dr. Eugene Lyon. The manifest listed 200 pounds of gold, 1,200 silver bars weighing 63 to 100 pounds each and more than 250,000 silver coins. But it didn't list these green beryl rocks, some of the world's most precious stones. Emeralds of this quality are so rare that they are more valuable per carat than diamonds.

The Spanish were meticulous. They listed and taxed practically everything of value or importance loaded on the ship. Why were such spectacular gems left off the manifest? Who owned them? It seems hardly thinkable they were considered only trinkets of no significant worth. Even the ancient Egyptians bestowed great value on emeralds. Were they being transported to the king or someone else of nobility? Where were they found? The answers are being uncovered using the same combination of Treasure Salvors' passion and scientific researcher's objectivity that originally lead Fisher and his crew to the wreck.

Despite unfounded criticism from certain parts of the educational archaeological community who, although invited, have refused to come see for themselves, Fisher's organization is determined to document all that is possible about this and other ships of the period. A more knowledgeable, better trained or better equipped team of accredited ancient Spanish shipwreck historians and archaeologists, public or private, does not exist. Instead of plundering history, the Treasure Salvors group keeps records that seem to be as meticulous as those found in the Spanish archives.

Under the supervision of chief archaeologist R. Duncan Mathewson III, a scientifically trained team makes sure every item of significance is noted on large

JEWELS

plastic overlay chart maps covering a search area some 20 miles long. Notes are kept as to the depth, location and other archaeologically important factors of each piece recovered. Each is assigned a permanent, numbered tag, entered into the computer and tight inventories are kept on its whereabouts.

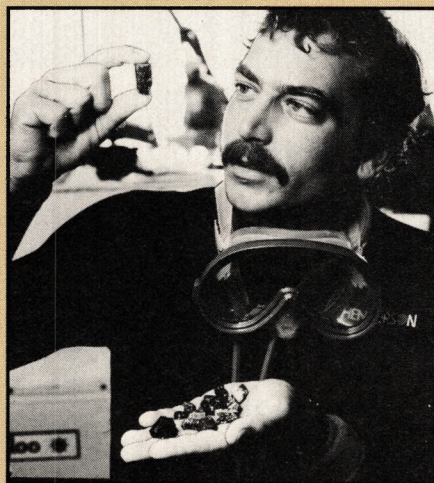
On the actual wreck site, each exposed timber of the *Atocha* has been measured, surveyed and plotted. Extensive grids were placed above the wreckage within days of its discovery and a detailed photogrammetric survey was completed. As winter approached, the area was carefully wrapped with thick plastic and covered with sand to prevent it from being disturbed by winter storms. When stable weather returned, even more detailed location study, estimated to last more than two years, would take place.

In the Treasure Salvors Museum, many of the most valuable items recovered have already been placed on public display. At the main entrance, a bronze ship's cannon is mounted as if stationed to protect the precious cargo stored inside. Other iron cannons have been carefully purified of more than 360 years exposure to seawater. Otherwise, they would have eventually turned to piles of rust. Inside, more than 1,000 silver bars are housed. Many can be touched and examined. Displays show how the ship must have looked, how the crew and passengers lived and how Spanish salvage attempts would have been made. More than 500 feet of gold chain has been recovered so far from the wreck site. Much of it, along with hundreds of solid gold bars and ingots stamped by the Spanish to show where they were mined and their purity, are behind glass. One bar can even be touched and lifted.

Other cases contain a priceless gold belt studded with precious stones and pearls, as well as a solid gold cross studded with enormous cut emeralds. Found several years earlier, during the search for the main pile, the cross was encased in a blackened silver box when it was recovered. After hours of carefully chipping away the ocean's protective crust, the magnificent artifact, along with a gold ring containing a 16 carat emerald, shined in the sun's light just like the day they were made. Highly detailed with ornate religious engravings, the cross, with its estimated 65 carats of emeralds, is beyond valuation. The stones alone are easily worth millions. In a nearby case, a collection of uncut stones, including some of the most valuable emeralds of the entire find, are specially lighted to re-

veal their intense color and fire.

Upstairs, in an area closed to the public, trained artisans, archaeologists, research librarians and historians work on their individual projects. Every single item is catalogued and photo registered in a high capacity computer system. In one corner stand several intact, as well as reconstructed, pottery jars. Alongside is one of the world's largest jigsaw puzzles. Thousands of pottery shards, once containing everything from water to fuel to food, are being meticulously reassembled. Marine archaeologist Mitch Markin is earning his Ph.D. while searching through the pieces looking for any that may match. When they are reconstructed as completely as possible, specimens are sent for more complete scientific evaluation. Using sophisticated



Andy Matroci

chemical analysis on the residue that remains, Mitch and his experts are finding out precisely what was being carried to provision the more than 250 persons on-board. Their goal: to learn more about the lives of passengers and crews who had to endure months at sea, during precarious crossings, in a ship not much larger than an average fast food restaurant.

In another area, silver artifacts and coins are being carefully cleaned of silver oxides. Blackened by exposure to seawater, every silver item recovered is exposed to a weak electric current. Slowly, many return to their original beauty. After cleaning, the coins are carefully examined, computer graded and divided into groups by original mint and condition. Some extremely rare coins have made historians aware of Spanish mints and assayers previously unknown. These often represent the only ones of their type known to exist anywhere in the world.

Some of the more fragile silver pieces require additional study and attention before they can be cleaned or restored. To facilitate this, artists carefully reproduce the images from the damaged, as well as all undamaged, ornate silver and gold objects. By carefully recording the art etched on these pieces of history, which

can later be studied in detail by experts familiar with this period, new insights are being found as to how the elite, as well as common people, of the period lived. The study has already revealed that the Spanish were being influenced by the art of the Inca Indians and vice versa.

As we rafted the *Dacor Diver* to the side of the *J.B. Magruder*, one of Treasure Salvors' largest search vessels, Captain Dick Klaudt was beginning to lower his drum-sized mailboxes into the water to bring home the "mail." Attached to the transom of the *Magruder*, the L-shaped tubes redirect the jets of water created by the boat's enormous diesel engines, aiming them at the bottom. Almost 50 feet below, the water churned with sand, dropping the visibility to little more than that of milk. Developed by Fisher, the mailboxes, as well as the airlifts later used to carefully search the area for smaller, more delicate objects, have been used during the entire search for the *Atocha*. Both now, and prior to the finding of the mother lode, they were responsible for exposing practically everything of value that has been found.

As the captain idled the *Magruder's* engines, the next team of divers prepared to jump over the side. The mailboxes had punched holes in the sand, exposing the near solid rock bottom. With the diesels left in idle to direct clearer water down so the divers can see in this soup of sand and seawater, they fan the bottom with their hands. This, and practically every dive made in previous days, proved successful almost beyond belief.

Diver Bill Barron surfaced with two emeralds, one in his facemask and the other in the sleeve of his wetsuit. He and Vince Trotta have proven to be among the most successful, or lucky, at finding the gems. Three days earlier Bill had uncovered a spectacularly clear stone weighing close to 30 carats. On the same day, Vince found 10, one weighing almost 40 carats and four others weighing 20 carats or more! On board the *Magruder* at the time we arrived were, in addition to those already in the museum, 58 rare gems. Nearby, the recovery ship *Dauntless* had found 15 stones and another solid gold chain almost six feet long. In the next few hours five more emeralds would surface. The total estimated value of this group, before a qualified appraisal, was perhaps as much as an additional \$15 million! In the months that would follow, the total number of stones of this clarity would rise to nearly 500. A cache of 2,500 emeralds of lesser value would also be recovered.

Now, the meticulous work of the team's historians and archaeologists is truly beginning to pay off in knowledge and wealth. From recent historical research, and a better understanding of how the Spanish recorded their cargoes, it is known the emeralds came from what was once one of the Inca's most treas-

(Continued on Page 48)

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GEAR FOR ADVENTURE.

Substrobe MV

Ikelite's most compact TTL strobe

TEXT AND PHOTOGRAPHY
BY GERI MURPHY



Ikelite has built its reputation on such practical designs as the Substrobe M—one of the smallest, simplest and least expensive U/W strobes ever made. Thousands of these little orange gems have found their ways into the homes and hearts of divers around the world.

Now, Ikelite has introduced a TTL automatic version called the Substrobe MV. It is one of the newest members of a new generation of "smart strobes" that can out think the photographer. Equipped with ultra sophisticated computer chips, the TTL strobe produces precisely the right amount of light to perfectly expose each and every picture.

GENERAL DESIGN

The new MV is the same size and shape as the earlier Substrobe M and MS versions. Cylindrical in shape, it is 4.5 inches long and 3.6 inches in diameter. It weighs 14.5 ounces without batteries. It is a tough little strobe, guaranteed to a depth of 300 feet.

For its weight and size, the MV pro-

duces an impressively bright flash. It has a guide number of 92 with ISO 100 film. The angle of coverage is 65 degrees, more than sufficient for either the 35 or 28mm Nikons lenses.

Powered by four AA batteries, this little mightymite can deliver up to 250 flashes when using alkaline batteries. Recycle time is five seconds. Should you choose to use Ikelite's rechargeable nickel cadmium batteries, the MV will deliver 180 flashes and recycle in three seconds!

The MV offers tremendous flexibility for the photographer who wants to switch modes or equipment. The on/off switch provides the option of operating the strobe on manual (for the Nikons III or IV cameras) or on TTL with the Nikons V.

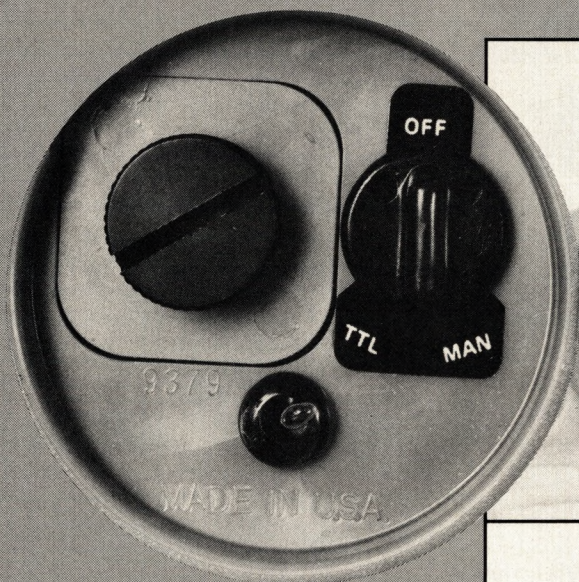
The MV is equipped with a removable sync cord that unscrews at both ends. This feature allows the strobe to be easily packed for travel and reduces the chance of cord damage. It also allows a broken cord to be quickly replaced by a spare (spares are highly recommended for dive trips to exotic spots).

If the MV is not being used in TTL mode, it can be fitted with several different sync cords that will connect to EO, Nelson or Ikelite flash fittings. This allows the strobe to be used with a wide variety of underwater camera housings.

TTL FEATURES

The little Substrobe MV is equipped with the same TTL electronic circuitry as its larger, more expensive cousins, the Substrobe 150 and 225. TTL automation provides precise flash exposure control by measuring the amount of light that passes through the lens and strikes the film. It's the most accurate way to measure and control flash exposure. The TTL mode automatically compensates for variations in flash to subject distances, object reflectivity, changing f/stop settings, use of filters or macro extension tubes.

This particular TTL system is designed to work with the Nikons V—the only underwater camera model with TTL exposure capability. It is what photographers call "a dedicated flash system." Here is



The Substrobe MV will operate on manual or TTL automatic flash exposure and is powered by four AA cells, which produce up to 250 flashes. The strobe uses a special five pin connector cord for TTL automatic exposure. If it is not being used in TTL mode, it can be fitted with several different sync cords that will connect to EO, Nelson or other Ikelite flash fittings. Opposite page: Ikelite includes an exposure decal with every Substrobe MV. It lists f/stop settings for manual and TTL flash.



how it works. A silicone photodiode (SPD) sensor deep within the Nikonos V camera body measures the amount of light that passes through the lens and strikes the film. When a sufficient amount of light (for proper exposure) has reached the film, the camera sensor transmits an electronic signal to the TTL strobe. Upon receiving this "stop" signal, the TTL strobe quenches or cuts off the flash. All of this communication between camera and strobe occurs in the smallest fraction of a second.

Impressed? Wait, there's more. The TTL circuitry in the Substrobe MV will also warn you if the strobe is underexposing the picture or if the camera or strobe is mistakenly switched to the wrong setting. I told you this strobe was smart!

The proper setting for the camera TTL is A for automatic. The strobe is then switched to TTL. When the strobe's ready light comes on, a corresponding ready light appears in the window of the camera's viewfinder. This is a steadily glowing, tiny red thunderbolt. If you look into

the viewfinder and discover the thunderbolt blinking, the TTL system is telling you something is wrong. It could be that the strobe was mistakenly switched to manual or it could mean the camera's shutter speed dial is set on M90 or something other than A.

The underexposure warning is the same blinking thunderbolt, but it occurs after the flash has been fired. The blinking lasts for approximately two seconds. Underexposure is caused by either an incorrect f/stop setting, holding the strobe too far from the object or because your subject was a dark object with low reflectivity. The amount of dialogue between the TTL strobe and Nikonos V camera is simply amazing.

CONCLUSIONS

We took the Substrobe MV on a trip to the Caribbean for open water testing. We found it traveled well and took up very little space. The strobe performed as advertised, clicking off one perfectly exposed picture after another. It proved

particularly helpful for shooting close-ups with the Nikonos Close-Up Kit.

Can the TTL exposure system be fooled? Yes, there are a few situations where TTL will give the wrong exposure. For example, taking a picture of a small fish against open water will result in an overexposure. The lack of reflective background fools the camera into thinking more light is needed. These are the little quirks of TTL that can be learned in the course of time and experience. Understanding the basic principles of flash photography is the key to successful use of TTL equipment.

Overall, the Substrobe MV performed like a champ. Ikelite has certainly packed a lot of ingenuity into a tiny package. The MV sells for \$169.95 and the special TTL sync cord is \$59.95. Camera tray and flash arm are extra and there is a wide selection available. For more information about the Substrobe MV, see your local dive store or contact: Ikelite Underwater Systems, 50 West 33rd St., Indianapolis, IN 46201; phone (317) 923-4523.

Oceanic Black Max

A Racy Instrument Console

TEXT AND PHOTOGRAPHY
BY BONNIE J. CARDONE


The BlackMax NavCon contains a depth gauge with a maximum depth indicator needle and an LCD display that keeps track of your bottom time, surface interval and dive number. Below this is a pressure gauge. Both gauges have black dial faces with fluorescent red numerals and needles.

If I were asked to describe Oceanic's BlackMax NavCon in two words, "sleek" and "chic" are the ones I would choose. The console housing is black, as are the dial faces of its gauges. What's new is that the markings and needles on the faces are red. Besides reminding you of a sexy sport car instrument panel, the gauge faces are actually easier to read than those that are luminescent. This is because the black background does nothing to distract the eye from the fluorescent red numerals and needles. As Sport Chalet instructor Darren Douglass says, the dial face numbers "jump right out at you" even at depth.

The BlackMax is a good example of a modern phenomenon: An instrument panel that tells you everything you need to know in just one glance. The BlackMax, for example, contains a pressure gauge; depth gauge; bottom time and surface interval tracker; maximum depth indicator; and a compass. And yet, this is not a heavy, clumsy piece of equipment. The compact console boot measures only five and one-quarter inches, from the top of the BlackMax to the bottom of the pressure gauge.

The Lexan® housed DataMax performs five functions. It tells you your present depth and marks your maximum depth with a special needle. You turn this latter back to 0 at the end of each dive by means of a slotted screw in the middle of the dial face. The depth gauge is an air filled, diaphragm type instrument with a rack and pinion movement. Just below the maximum depth needle screw there is an LCD display with three windows. The one on the far left tells you your current bottom time. The one in the middle counts your dives. When you surface, the window on the far right keeps track of your topside time. All of this is done automatically, preventing user error. The display switches itself on during the first dive when a depth of eight feet is reached. It turns itself off 12 hours after the last dive. It can track up to 9 dives and bottom times of up to 9 hours, 59 minutes. The DataMax is based on the U.S. Navy repetitive dive tables. Rated to a depth of 200 feet, it is powered by two silver-oxide cells that will last for more than 6,300 hours or 315 diving days.

Below the DataMax in the boot is a spiral wound Bourdon tube pressure gauge, rated to 4,000 psi. The case is Noryl®, the lens, Lexan. The pressure gauge has a special, one-way valve on the back in place of the standard blow-out plug. This means it will vent excess pressure (during airplane travel, for example) without leaving a hole through which water could enter. On the back of the console there is an Oceanpro compass. A slim, oil filled instrument, it has a doubled jeweled movement for smooth operation of the compass needle and a one-way, ratcheted bezel. The slim console is angled for easy reading.

The BlackMax NavCon sells for \$320. See it at your Oceanic dealer. 

There is an Oceanpro oil filled compass on the back of the console. This has a double jeweled movement for smooth operation of the compass needle and a one-way, ratcheted bezel. The slim console is angled for easy reading.

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TUITION BEGINS AT \$1,500

Some knowledgeable people view the new Rigid Inflatable Boats (RIB) as the wave of the future. Indeed, with all they have to offer, these new boats may very well be. Well designed RIBs combine many of the best features of an all rigid hull with some of the most desirable qualities of a "soft" inflatable. An RIB can provide the greater speed, more comfortable ride and better maneuverability (i.e., tighter turning and straighter tracking) of a fine rigid hull, while offering the lighter weight, shallower draft, far greater carrying capacity, better stability at rest in the

hull bottom and the deck adds still another airtight compartment. Built into the deck are four davit lifting eyes, a molded footrest and inflatable seat retaining points. A stainless towing eye and and a plastic lifting handle are at the bow and two additional molded lifting handles are attached to the outboard sides of the rear tubes. Lifelines, secured to lacing cuffs on top of the side tubes, run the length of the open deck. Additional standard equipment includes: two hardwood paddles, with retaining straps that stow them out of the way; a fitted stowage

on as well as other fine inflatables. In my several visits there I have found the owner and staff to be extremely knowledgeable and very helpful and their stock to be extensive. If you are in the Southern California area and are interested in an inflatable, pay Port-A-Marine, or their associated store, PAM Marine in San Marcos, a visit. The experience will be educational and may just get you hooked on one of these versatile boats.

The S400 RIB's evaluation took place in moderately choppy waters off the coast of Newport Beach. The boat was



TEXT AND PHOTOGRAPHY BY GEORGE COZENS

water and the increased safety of an inflatable. High performance and greater safety—you can have your cake and eat it too!

An example of just such a marriage between the better qualities of a rigid hull and those of an inflatable is Avon's S400 RIB. The name Avon alone brings to the minds of many experienced boaters visions of quality construction. This successful British company has been making inflatable boats for more than 25 years and has been involved in rubber products since 1885. The S400 RIB is no exception to the fine Avon tradition.

Overall this boat is 13'2" (4.00 meters) long, with a beam of 5'6". With 17 inch diameter tubes that extend well beyond the transom for more buoyant support of the engine, the internal deck space is reduced to 9'2" x 2'8". The forward deck area is limited to equipment stowage, however, because of a permanent bow-dodger. Nylon is the basic tube fabric, with DuPont Hypalon coatings forced into the fabric from both sides with computer controlled rollers. Seams are overlapped and joined with Avon's special three-part adhesive and bonding process. These tubes are divided into three separate, airtight compartments. Valves to these compartments have large bores for quicker inflation and deflation and come equipped with a plastic cap that provides a secondary air seal in case the valve should leak.

The S400 qualifies as a RIB by virtue of its rigid fiberglass, shallow V-hull. This has an integrally molded transom, with a self-bailing drain and is bonded permanently to the tubes. A space between the

pocket to keep small articles dry; fuel tank retainers; a combination hand/foot bellows; and a maintenance kit. Optional equipment available includes a pressure gauge, launching wheels, single or double inflatable seats, a windshield and an operator's console with remote steering.


Engines with horsepower ratings up to 40 hp can be used on the S400 RIB, although the recommended range is between 15 and 35 hp. The manufacturer indicates that a 10 hp engine should be able to produce speeds of about 22 mph with only one occupant and 8 mph with six riders. With a 40 hp engine the boat is said to be capable of reaching speeds of 35 mph with one rider and about 26 mph with six. As intimated earlier, speed is one of this RIB's strong points. So is payload or carrying capacity. Although this boat weighs a mere 210 pounds, it can carry more than 1,400—almost seven times its own weight. You won't find many hardhull boats that can do that. Because the tubes are bonded to the hull and transom, the boat is not routinely disassembled. So, you may have a difficult time storing this inflatable under your bed. However, its light weight does allow convenient launching from a beach when the optional launching wheels are used. And, including a 25 hp engine and lightweight trailer, the boat can be easily trailered behind a mini-car, since the whole package will typically total less than 600 pounds. Still another advantage is that once you get to the water it takes only minutes to launch.

Evaluation of the Avon S400 RIB was arranged through Port-A-Marine in Costa Mesa, California. This dealer handles Av-



The Avon S400 combines the best qualities of a rigid hull and an inflatable.

furnished with standard equipment and a 25 hp, long shaft engine. Passengers/divers included, at various times, Jan Tunnicliff and Ed and Sandy Fieser of the Sculpins Dive Club in Long Beach, in addition to Scott McIntosh and Pete Ely of Port-A-Marine and myself. In a word, the trial runs were exhilarating. This RIB, with three to four people and some dive gear, handled very nicely. Owing to the chop the ride was a little bumpy, but not uncomfortable. At the speed we were going, it was advisable to hang onto the lifelines tightly. Spray was not really a problem. The V-shaped hull cut the chop easily, curling the water away from it. The boat responded quickly to the tiller, taking sharp turns with a minimum of side-slip and no cavitation whatever.

The Avon S400 RIB proved to be a fast, stable, safe and very fun boat. Its size, light weight and large capacity make it an extremely versatile boat—an all around, ideal boat for a small group of divers. These features, plus Avon's reputation for quality, a five year warranty on the coated fabric and a retail price of \$3,150, suggest this is one RIB worth serious consideration. 

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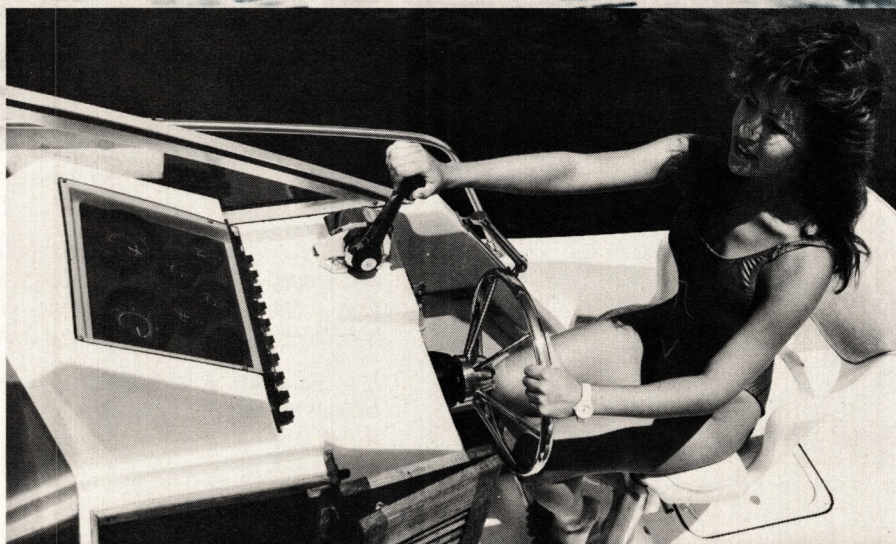
SEA OX 230C

Walkaround Cuddy Cabin

TEXT AND PHOTOGRAPHY
BY STEVE LUCAS

Forgive me Chuck, I just couldn't keep myself from borrowing your line: After the SDM editorial team visits the major boating shows around the country to select boats to write about, someone asks someone in the promotional department to mail me everything they have in print on that boat. Well, when I got two thick packages from Sea Ox I knew someone was awfully proud of their boats and really wanted me to know about them! Inside was a whole stack of material on the 230C Walkaround Cuddy Cabin. In addition to the usual stat sheets, manufacturer's specs and color catalogues, there was an article on the Sea Ox 230C by boating writer Chuck Cadieux. The headline read: "Fishermen love her—they know she's a boat you can mommick." Mommick? Well Chuck, I read your article. And, once I saw her on the water I can tell you, this is a boat divers will love to mommick too!

Actually, I've seen a lot of Sea Ox boats. If you spend much time on the water it's hard not to. The U.S. Coast Guard uses them, the National Oceanic and At-



The Sea Ox 230C is a full 23 feet long, has an eight foot beam and draws only 12 inches of water. The cockpit is 11 feet long and midship freeboard is 26 inches, dropping to 24 inches aft. The fiberglass deep V-hull is an impressive 13 layers thick and extremely stable. Five gusseted stringers are laminated to the bottom. The cabin liner is fiberglassed to the hull for strength. With an OMC 2.6 liter V6 Sea Drive the boat can reach 45 mph. The instrument panel is completely covered.

mospheric Administration (NOAA) uses them, the Army, Navy and Army Corps of Engineers use them. With its deep-V forward hull that tapers to a 14 degree deadrise, the boat is stable, fast (over 45 mph with an OMC 2.6 liter V6 Sea Drive), dry and can handle quite a load. Once she gets up on plane the front of the boat lets those flat chines throw the spray out and back. No cold seawater showers on this one, just smooth, dry rides.

With engine, the 230C is heavy. But it

uses its weight to really smooth out the ride. With the OMC Sea Drive it weighs close to 3,500 pounds. The majority of this weight comes from the multiple layers of fiberglass that make up the hull and integral cabin liner. At 13 layers thick, the hull is laid with 24 ounce woven roving alternating with a one and one-half ounce mat. Talk about solid: Instead of the usual three, the Walkaround Cuddy has five gusseted stringers laminated to the bottom of the hull and is completely encap-

sulated in fiberglass. Unlike most similar boats, the cabin inner liner is not screwed or bolted on, but fiberglassed to the hull, giving the boat a great deal more strength—more than enough so it can stand up to all the mommicking you can dish out.

At 23 feet (that's right, this 23 footer really *is* 23 feet long) the 230C has a full eight foot beam and draws only 12 inches of water. The midship freeboard is 26 inches, which drops to only 24 inches aft. The cockpit is a full 11 feet long, leaving lots of space for tanks and gear bags. Fuel capacity is 115 gallons and the boat can handle engines of up to 240 hp.

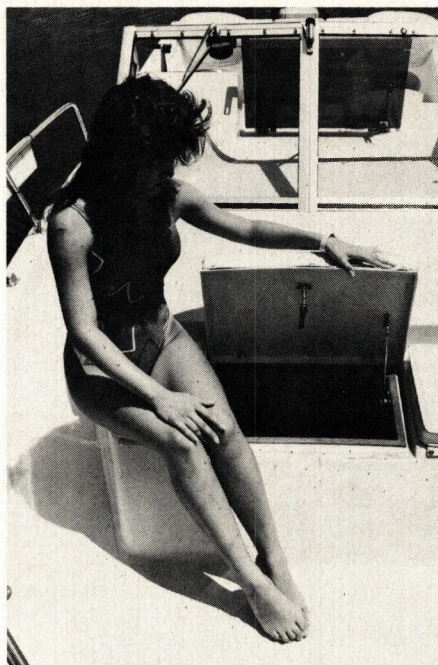
From bow to stern the 230C is loaded with useful features. At the bow there is a heavy duty fiberglass pulpit. The bow is also equipped with a built-in anchor roller, an eight inch heavy duty cleat and a rope locker. If you've ever drawn anchor duty you'll quickly learn to appreciate these. There are also boarding lights, which can illuminate the entire bow and foredeck for night anchor pullers. Just in front of the walkaround cuddy cabin there is also a comfortable step seat where your passengers can enjoy the breeze while you are running across the bay.

There is a radio compartment at the helm station, an insulated storage compartment with overboard drain, and a completely covered instrument panel with all-weather protection. A tackle box is built-in on the port deck just outside the cabin entrance. Starboard, there is a useful utility compartment for dive gear storage or fishing equipment. For bait and extra storage there are four separate, fully insulated ice-down compartments. The fish box is more than six feet long!

The 230C's cabin is larger than most boats of its size. Inside there is direct and indirect lighting, a ceiling access hatch to the back of the instrument and fuse panel and a concealed marine head compartment. Along the hull walls are built-in rod racks. There is a large forward fresh air hatch overhead. The V-berth is extra long and with the addition of filler cushions can sleep three instead of the usual two.

The deck has a special non-skid texture. It and the rest of the boat is very tough and can really withstand a lot of punishment. You can even mommick it! Oh yeah, I guess I better tell you the rest of Chuck's story.


A lot of Sea Ox boats are used by commercial fishermen on the East Coast. Near Cape Hatteras one fisherman told Chuck he expected all his buddies would be using Sea Ox boats in the next few years. Why? Because they can really stand up to the mommicking a working fisherman can give them. Chuck was not familiar with this term and was a bit hesitant to ask. But, he finally did. "To treat cruelly," a boater told him. Well, if dropping tanks and bouncing weightbelts on



the deck of your boat is *not* mommicking it, I don't know what is.

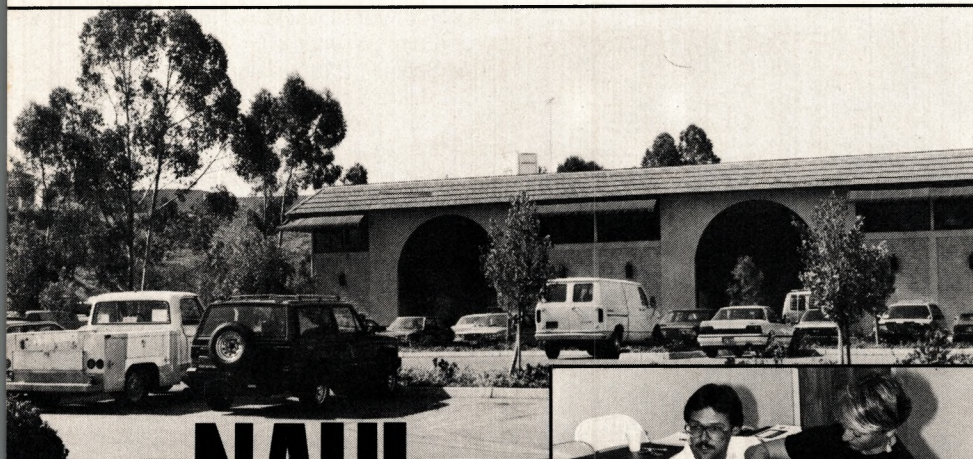
The Sea Ox 230C, equipped with the OMC 2.6 litre Sea Drive, lists for \$28,860 FOB. If you prefer to add your own outboard, the base boat is \$18,660. In case you prefer a center console model to a cuddy cabin, the same 230 outboard hull lists at \$12,975. All Sea Ox hulls come with a three year warranty.

If you want a boat that can safely take you diving just about anywhere and hold up to the mommicking divers can dish out, pick up the phone and ask Sea Ox where you can see one: (919) 758-9901. If you want a color catalogue and spec sheets write: North American Fiberglass Corp., P.O. Drawer C, Greenville, North Carolina 27835.

Thanks, Chuck. You can borrow one of my lines anytime. 

The Sea Ox 230C has four fully insulated ice-down compartments. With filler cushions the cabin can sleep three and features both direct and indirect lighting.





NAUI COLLEGE

Small Class Size Produces Quality Instructors

TEXT AND PHOTOGRAPHY
BY JIM WALKER

In the rolling hills of Laguna Niguel, California, just minutes from the famous mission San Juan Capistrano, and just a few more minutes from well known beach dive sites, sits a modest commercial office building. Inside are pleasant, modern suites. In this unassuming setting an impressive thing happens: Good people teach good people how to train good divers. This is NAUI College and people are its main asset and concern.

NAUI COLLEGE DEFINED

Primarily, NAUI College trains scuba instructors. It does so under the auspices of the National Association of Underwater Instructors and in accordance with NAUI's motto of Safety Through Education. But, more than that, NAUI College has its own philosophy: As Jim Hicks, college president, put it: "We train instructors who want flexibility in decision making." The aim is not just to train instructors, but to prepare graduates to succeed in the industry. This success is measured in terms of the quality of the instructors' careers and in the quality of the divers they certify.

NAUI College trained more than 40 percent of the NAUI scuba instructors certified last year. That represents an increase of 80 percent per year over the last four years. And, at this writing, mid-year student registrations were up 198 percent from 1985. Yet, surprisingly, this is not an assembly line operation. If you're looking for the anonymity found in



Top: NAUI College is in the pleasant, rolling hills of Laguna Niguel, California. **Center and right:** Kit Eisler conducts first aid training. **Above:** Jim Hicks, NAUI College president (left) and Curt Pihl, marketing consultant.

30 students to a class, go elsewhere. Typically, NAUI College classes run three to four students per teacher. The personal touch is a part of the curriculum.

HISTORY

NAUI College's Jim Hicks laid the groundwork for this enterprise with a vocational aquatics program he established in California school districts in 1973. His successful program caught the attention of NAUI and, five years later, in association with them, he established the NAUI Professional Development Center in Cypress, California.

The Cypress operation increased its scope and activity over the next few years. In 1984, to distinguish it from other PDCs existing at the time, and to better illustrate its curriculum, its name was changed to NAUI College.

NAUI College continued to grow until the facilities available at the Cypress location became constricting. It needed more flexibility in classroom arrangement and higher visibility in the industry. So, in June 1985, the college moved to its present location in Laguna Niguel.

PHYSICAL SETTING

NAUI College occupies suites of rooms on two floors in the aforementioned office building. The site is just off the San Diego Freeway on a quiet street in rapidly growing, but still open Laguna Niguel. There's plenty of parking. At this time the college typically uses six to seven rooms at peak periods, but it has the capability of utilizing as many as 20. Pool training takes place at an Olympic sized San Clemente City pool just five minutes away.

CURRICULUM

NAUI College is approved by the State of California for post secondary education. Veterans Administration sanction is pending. For students desiring it, the college has arranged excellent rates with a private lender for tuition loans.

Six core courses and a variety of specialty certifications are offered. The most important course, in terms of scope of training, is the Ten Week Professional Instructor course (more on this later). Other



courses include: Total Instructor Training Course (two weeks); Instructor Training Course (nine days); Weekend Instructor Training Course (five to seven weekends); Divemaster Course (four days); and Diving Rescue Techniques Course (two to three days). In addition to the specialty instructor certifications, crossover courses are offered for instructors from other certification agencies and extension ITCs are offered at locations around the world.

PRO INSTRUCTOR COURSE

The Ten Week Professional Instructor Course was developed in response to requests from employers for instructors with training and experience above the norm. Pro Course graduates have been trained in all phases of sport diving from teaching to store management. More than 30 sub courses are covered in the pro course, including: NAUI diving instructor, securing a job, resort dive-mastering, equipment repair, marine biology, emergency procedures, compressor operations, light salvage, search and recovery, first aid and CPR.

INITIAL CONTACT/ALUMNI

Students are attracted to NAUI College in two ways: by referral from alumni and by direct contact. When prospective students contact the college on their own, they are given an information packet and brochure outlining the courses. At that time they are informed that the college will gladly furnish further information, but will not contact them again unless requested to do so. When asked about this "soft sell," Curt Pihl, NAUI College marketing consultant, indicated that this attracts high caliber, motivated students who know what they're looking for. Jim Hicks said these people are often successful in other ventures and are more mature than the average instructor candidate elsewhere. (The median age of NAUI College students is 29.) These people are aware of what they want upon graduation and know the college can prepare them for it. Often, they have looked into other instructor certification courses before deciding on NAUI College.

As proof of the success of NAUI College, it has an unofficial, but tremendously strong alumni association. Jim Hicks said, "About 90 to 95 percent of our graduates indicate they would be glad to refer students to us, and about 40 percent of our students are referred by alumni." These unofficial college representatives even donate their time. Approximately ten instructor graduates volunteer a few hours per month at the college.

HOUSING

Many NAUI College students come from out of state or out of the country. Naturally, one of their first concerns is where they will stay during their course of study. The college is in a resort area with plenty of motel rooms available in a variety of prices as well as short term rentals of houses and apartments. Often students share rent. A local travel agent will help arrange accommodations at no cost to the student and an apartment finding service is available.

NAUI COLLEGE PEOPLE

The teaching staff of NAUI College varies in size depending on the number and type of courses occurring. When I visited the facility, instructor George Bodinar was out with a class at the beach. Kit Eilser was conducting a first aid course for four students and everyone was on a first name basis. The atmosphere was one of friends learning from each other. This is typical: NAUI College is adamantly concerned with training quality, thinking instructors who aren't afraid to ask questions. To create knowledgeable, caring scuba instructors, the college staff exhibits the same qualities. Many lasting friendships are born in this manner and this is one reason the alumni contact remains vigorous.

Aside from being great people, the staff is the "cream of the crop"—not just

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NAUI COLLEGE

people who can teach, but people who can teach at the instructor level. Many of the staff members are former NAUI National Training Directors. In addition to being scuba instructors, the staff members are experts in the area they teach: For example, the physics instructor is actually a physics teacher.

PLACEMENT

Students of the Pro Course are taught how to present themselves positively to prospective employers—how to "close." Interview techniques are practiced and critiqued. Help in preparing a resume (as much as the graduate needs) is provided. Further, lifetime placement assistance is provided. Jim Hicks explained that this doesn't consist of the college maintaining a large listing of job openings: "Good jobs don't stay open very long." Often resorts and other employers will inquire ahead for people. Curt Pihl indicated that a response often received when the college contacts a potential employer is, "We don't have any openings—who do you have?"

The high caliber students attracted to NAUI College often know how to market

their skills. However, the college teaches its graduates how to be aggressive in seeking placement. As in the curriculum, the idea is to provide the graduate with "the tools for success." Naturally, the success of a graduate's job search is dependent on its scope. If he/she is looking for certain hours doing certain things in a certain location where few divers travel, it may take a long time. Jim Hicks indicated the average wait for placement after graduation is less than one month. And, NAUI College graduates know where they want to go and what to expect when they get there. They are mature enough to handle the imperfections found on any job and, consequently, satisfy employers and themselves.

BOTTOM LINE

NAUI College offers personalized, quality training for careers in sport diving. Don't expect a watersports center, those old ivy halls or fraternity parties. Do expect a businesslike approach to training and an ongoing commitment to graduates. For information and a brochure, write to: NAUI College, 27402 Camino Capistrano, Suite 103, Laguna Niguel, California 92677. You can call toll free outside of California to (800) 423-7095. In California you can call collect to (714) 582-0186 or toll free to (800) 227-6663.

ATOCHA EMERALDS

(Continued from Page 36)

ured secrets: the still working Muzo emerald mines of Columbia.

Some staff members now believe, although there is no conclusive evidence to support their theories, the emeralds may have simply been listed on the ship's manifest as chests of cargo. One, although there is some disagreement on his belief, also theorizes the stones may have been sorted and shipped by grades. Fisher's team has found many top quality stones that could have conceivably come from a single chest. Nothing even remotely close to the consistent quality and size of these has been found in Columbia in many, many years. The team also found the 2,500 lower quality stones in a pile, apparently all from one chest. Could there be large caches of each grade still unfound?

Considering the enormous amount of ocean bottom that remains to be searched, and because at least one earlier ship is historically known to have successfully carried several hefty cases of emeralds back to Spain, Fisher now believes a similar quantity could be aboard the *Atocha*. His salvors are no longer measuring their total find in carats. They have already recovered more than two pounds of the gems! So, how many more

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are there? When asked, Mel remained quiet for a few moments as if pondering the possibilities. After about 30 seconds, he smiled and replied almost matter of factly, "Maybe a couple hundred pounds." If so, along with the stones already recovered, the total ship's treasure could skyrocket to more than double any of the total valid estimates!

And so the search continues—not only for jewels and gold, but for answers. Mel Fisher has successfully married the science of marine archaeology with the persistence of a highly skilled team of treasure hunters. By utilizing the free enterprise system, he has done what few, if any, purely academic institutions could have. He has more than satisfied his investors and, at least for the moment, his own curiosity, as well as stirring the public interest—through mass media exposure—to want to know more about 17th century Spain's expeditions into the new world. He has pulled history off a dusty old shelf, made it the stuff of newspaper headlines, brought it to life and put it on display for everyone to see. Mel has melded the dreams and passions of an adventurer with the objectivity of science. Alone, neither would be worth as much to the world. Together, a wealth of more easily understandable, exciting and still scientifically valuable knowledge is being uncovered daily. And, you can see it, touch it and learn about it down at the end of Green Street in Key West.

Note: The television version of Mel Fisher's 16 year search for the *Atocha*, *Dreams of Gold*, starring Cliff Robertson and Loretta Swit, is scheduled to be aired on CBS soon. 🐟

NEW ENGLAND DIVE MAP

Gold Cartographics of Cambridge, Massachusetts has published The Central New England Coastal Diving Map. This map/poster is a full color, 24 x 37 inch guide to dive sites accessible by car in more than 25 coves, inlets, points, etc. along the Atlantic coastline from Cape Ann, Massachusetts to Jamestown, Rhode Island. A brief description of each site is included as is a list of dive shops and clubs. Emergency and safety information such as Coast Guard bases, chamber facilities and weather service centers is included as well.

The Central New England Coastal Diving Map (\$6.95) is available at dive shops or from Gold Cartographics, P.O. Box 1813, Cambridge, MA 02238 (add \$1 shipping charges). 🐟

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Photograph by Steven M. Barsky

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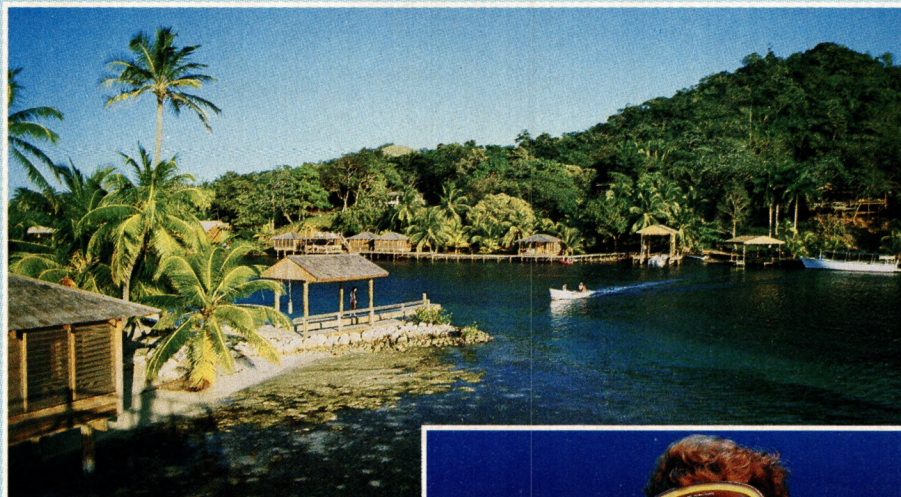
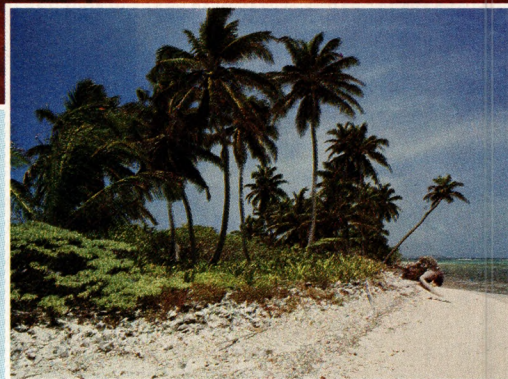
BAY ISLANDS, HONDURAS

Emerald Isles Of The Western Caribbean

TEXT AND PHOTOGRAPHY BY RICK FREHSEE



Above: Tranquillity reigns at sunset on Bailey's Key, Roatan. The Bay Islands are incredibly picturesque, undeveloped and unpoluted. Left: A diver swims over the 140 foot freighter, *Prince Albert*, within snorkeling distance of CoCo View resort, Roatan. Right: The Reef House runs trips to the Pigeon Cays, off Roatan, which offer pristine white sand beaches and superb diving.



Above: Anthony's Key Resort has 44 bungalows scattered across an islet that was once a coconut plantation. Perched on a verdant hillside, the main house overlooks a quiet lagoon. Right: AKR underwater photo pro, Barbara Gent, plays with an octopus at the White Hole, Roatan.



The view from the air suggests a tropical masterpiece: Emerald islets scattered across a turquoise sea. At sea level it is equally impressive—verdant mountains, carpeted in luxurious green foliage, descend into the crystal sea. It would appear that in the Bay Islands of Honduras even the mountains swim.

The sunken spine of the Sierra de Omoa mountain range in Northern Honduras surfaces 35 to 70 miles out in the Caribbean Sea to form the beautiful Bay Islands. Collectively they consist of three major islands, Roatan, Guanaja and Utila, several islets (including Barbareta) and 65 cays (including the Cayos Cochinos).

The Bay Islands underwater environment is both rich and extensive. Fringing reefs surround the islands often within swimming distance from shore. Drop-offs are continuous and echo the profile of the shoreline. The physical features of these reefs are similar to Cozumel and the Belize offshore islands: The system is a continuation of the western Caribbean barrier reef extending from Mexico to South America—generally regarded as the second largest barrier reef system in the world. Caves and caverns are common features and details that are specific to the Bay Islands include a wide variety of

This is Anthony's Key

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Above: Caribbean Sailing Yachts (CSY) has a country club atmosphere, 20 modern, well equipped rooms, a freshwater pool and 10 sailing yachts, each of which is 44 feet long. Any combination of sailing/diving days can be arranged on a CSY package. Right: Jeanette Holmes pauses on Bayman Drop, a wall dive off the island of Guanaja. The Bayman Bay Club is located on Guanaja, considered by many to be the most beautiful of the Bay Islands.



Above: Kathleen Reinman photographs colonies of purple tunicates in the Cayos Cochinos. These tiny cays are between Roatan and the coast of Honduras. Top right: The Bayman Bay Club is surrounded by a forest of fruit and flowered trees. Right: CoCo View's front porch offers some of the best diving in the Bay Islands. Bottom right: The *Prince Albert* sits upright on the bottom, just off CoCo View. The wreck looks like a Hollywood movie set.



BAY ISLANDS

sponges and the richest collection of pillar corals in the entire Caribbean.

I have been visiting and photographing the Bay Islands for nearly 15 years and am pleased to report they are still pristine and unspoiled. Also, they are still not very well traveled. Ideal islands like Roatan, Guanaja, Cayos Cochinos and Barbareta are incredibly picturesque. They have a rain forest appearance broken occasionally by palm plantations and white powder beaches. Photos taken here often reflect the appearance of a dream or fantasy island: undeveloped and unpolluted. The gemstones of the western Caribbean promise to become a major diving destination within three to five years.

The reason for the low key popularity of the Bay Islands today is the lack of direct air routes. Being there is heaven; getting there, depending on what kind of traveler you are, can be a bit tedious. Those who know and love these islands ignore the minor inconvenience. In fact, the experience is accepted as part of the adventure. Tan Sahsa, the major Honduras air carrier, flies modern 727 and 737 jets from Miami, Houston and New Orleans into La Ceiba, a Caribbean port town via San Pedro Sula, the second largest city in Honduras. A DC-3 flies into La Ceiba and then to Roatan or Guanaja.

After arrival at the resort, whether by overland truck or water taxi, you will be presented with a breathtaking display of total tropical expression. The Bay Islands is one of the best destinations anywhere to ponder two of nature's greatest forces of complexity and profusion butted up against one another where the jungle meets the crystal sea—or specifically, where a natural tropical rain forest, so riotous and tangled with 1,000 shades of green, borders the clear Caribbean and an unequalled explosion of marine life in the coral reef below. This is part of the sensuality of the Bay Islands experience and it is heightened and echoed by the physical appearance of most of the dive resorts. There are no phones, TVs, shopping centers, cruise ships, crowds of tourists, fast foods, highways or high rises here. In fact, until recently there were no paved roads. Today there is a small stretch of pavement in Coxen's Hole, the main town on Roatan.

The history of the Bay Islands is more with England than Spain. The original inhabitants were Payan Indians who all but disappeared with the arrival of the conquistadors. The first European settlers were undoubtedly pioneers, pirates and adventurers from England and Scotland. Probably the first permanent settlement was the Garifuna or black Carib village of Punta Gorda (north coast of Roatan). Descendants of the original settlers still live there today. There is also a sizable Gari-

funa village in the Cochinos Cays. Many Cayman Islanders migrated here in the mid-1800s and today's Bay Islanders are mostly seamen, fishermen, farmers and traders—descendants of the Scots-English seamen, Antillean blacks and some Spanish Hondurans. They are bright, humorous and friendly with a stable economy not dependent on tourism.

Last year, there were just more than 6,000 total visitors. As this is still a place that is a little difficult to get to, there probably won't be many more this year. The Bay Islands are still remote and pristine, displaying an unencumbered way of life almost devoid of commercialism. Tucked away in a corner of the Western Caribbean

and separated both by language and culture from the Spanish mainland, the Bay Islands most definitely dance to the beat of their own drum. In the not too distant future that will change. The form and fashion of change has not been determined but it is hoped it will proceed with caution. The resorts are growing, the Honduran government is working with the private sector toward mutual goals and a new paved airstrip, large enough for mid-sized jet service, is currently under construction at Coxen's Hole. When it is finished, the Bay Islands will be almost as accessible as Cozumel or the Caymans.

Bay Island dive resorts are a pleasant combination of lodges, guest houses and

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BAY ISLANDS

island style hotels. They vary in size from a small lodge to a sprawling 44 room plantation/resort. Each is distinctive and individual and many will be considered totally irresistible. There is a variety of activities to consider. Most watersports are offered, as well as side trips.

The food at the resorts is always good and often great. Each has its own dishes and specialties but there is an emphasis on seafood, island cuisine and local fruits and vegetables whenever possible.

Most resorts offer a day or night on the town or around the island, a wonderful opportunity to view nature's blessings close-up as well as sample and observe Bay Island culture. Bonnaca, off Guanaja, is an entire town suspended on stilts—the little Venice of the Caribbean. Oak Ridge or French Harbor provide a look at Roatan's impressive fishing industry. Several resorts will prepare mainland side trips. The most popular is a day or two at Copan, the magnificent and mysterious ruins of a great Maya ceremonial center. This great Indian civilization attained its highest development 600 to 1,000 years before Columbus landed on Guanaja in

1502. With a higher mathematics and level of architectural, scientific and artistic experience than would seem possible for this era, the Maya civilization nevertheless crumbled and all but disappeared into the jungle. Today the archaeological park at Copan and its nearby museum attest to the past triumphs of the Maya.

There are two recommendations you should consider. Be prepared for those flying teeth of the tropics, the infamous "no-see-ums." Also known as sand gnats, they are not usually bad at the resorts, but don't get caught in the wild without your insect repellent. Take two cans just in case.

Another helpful hint is to pack as lightly as possible. You won't need a lot of clothes. Keep your dive gear minimal. Photographers should carry a camera and strobe if possible. Dive gear is marked with a red priority tag (Tan Sahsa) but anything overweight is often subject to "next best flight" scheduling.

If you are not familiar with Central America in general or Honduras in particular a word of assurance may be necessary. Travel to Honduras and the Bay Islands is very safe. There are no known unpleasant incidents political or otherwise that have ever affected a Bay Island traveler. Indeed, it can be a family affair and children of all ages travel to and from the Bay Islands in predictable safety.

I have recently completed a photographic survey of Honduras from the Atlantic to the Pacific and from Nicaragua to San Salvador on assignment and have not felt the slightest uneasiness or intimidation. It's a good bet you are safer here than in your own home town or city.

This is a chance for adventure, an elusive commodity that has almost disappeared from a tame and predictable Caribbean. Here you can plan your own dives (every resort we visited emphasized flexibility with the dive plan) and be thoroughly entranced by a set of islands that achieve near visual perfection.

Tan Sahsa airlines is the primary carrier to the Bay Islands and throughout Honduras. Gateway cities from the United States are Miami, Houston and New Orleans. Challenge airways also services Honduras from the U.S. mainland.

BAY ISLANDS DIVING

The reef area is so extensive and the dive resorts so few there is very little chance you will see another dive boat during your visit. Where the best diving is in the Bay Islands is strictly a matter of opinion. You will undoubtedly hear conversations about north side versus south side, Roatan compared to Guanaja, and Cayos compared to the others. I have explored and photographed these islands, perhaps more than any other diver, and can honestly report great diving in all areas. While there is considerable individuality within the Bay Islands, most of the U/W signatures are shared throughout the area, with the exceptions noted.

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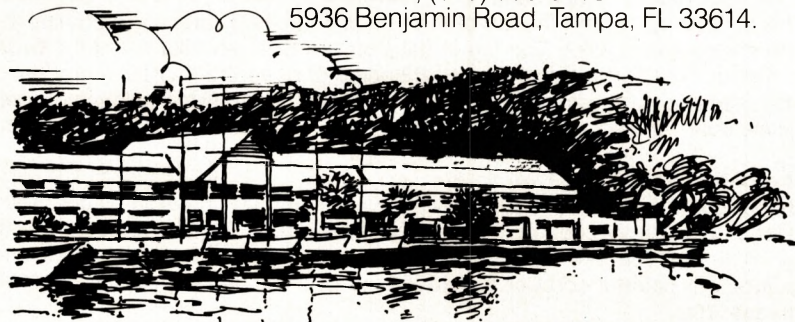
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ROATAN/ BAY ISLANDS

Bay Islands coral formations are mostly close fringing reefs, with deep water areas near shore creating extensive drop-offs or walls a short distance from the reef crest. A few areas near Utila, Cayos Cochinos and the Pigeon Cays close to Barbareta have a variety of patch, platform and bank reefs. An impressive feature of most Bay Island reefs is the extensive and dramatic spur and groove systems associated with modern and ancient river drainage and local tide channels. Most host operations feature a number of special dive sites through wide or narrow cracks and crevices with divers surrounded by huge masses of coral. Variations on this theme result in the development of numerous clefts, fissures, ledges, undercuts, overhangs, swim-throughs, tunnels, caves, caverns, holes and cathedral effects of sizable proportions throughout the Bay Islands. Perhaps the most memorable example of this characteristic is the dive site called Mary's Place on the south side of Roatan. There, a megaton section of the reef has wrenched away and separated from the vertical reef front, creating an inner and outer wall within a crevice that varies in width from a canyon entrance of about 30 feet across to narrow slits and single diver swim-throughs less than six feet across. Several other cracks have segmented the huge section of coral, creating alternate tunnels leading to the outer wall at depths of about 120 feet.

At Black Rock on Guanaja's north shore is the best example I have found of volcanic caverns. Lining the inside of this wide area of caverns and tunnels are abundant rolling and beaded igneous rock formations resembling pillow lava. It is an exciting area for exploration and wide angle photography. Other examples, nearly as impressive, are found throughout the Bay Islands.

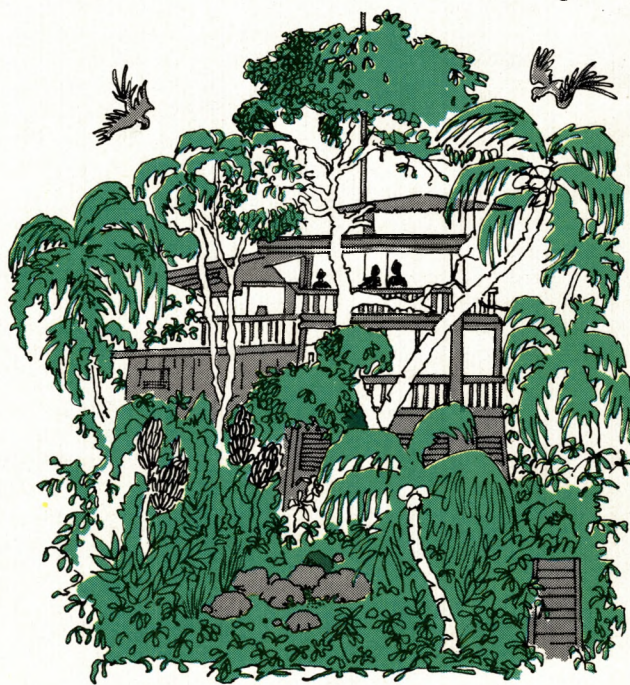
Fish filled caverns are another widespread Bay Islands signature. At Mary's Place off Roatan and off the east point and south side of Guanaja are many examples of tunnels and caverns often filled with tens of thousands of small silvery fry or minnows.

Walls and drop-offs are common and continuous on both sides of Roatan and Guanaja and on the south side of Barbareta. The walls produce a variety of cascading starlet and lettuce corals and a wide assortment of sponge types. Almost iridescent are the azure vase sponges in regular and irregular shapes and sizes. Common are yellow candlestick sponges, red, purple and buff rope sponges and buff-yellow tube sponges. Examples of exquisite wall dive sites are common, however Half Moon Bay Wall and West End Wall (inside and outside) on the northwest end of Roatan, and the Barbareta Wall are possible standouts.

Closely associated with the dramatic walls and canyons of the Bay Islands are numerous pinnacles or reef towers usually found at depths of 80 to 130 feet. Ex-

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BAY ISLANDS

cellent examples include the pinnacle off the Bayman shelf on the north side of Guanaja and Eagle's Perch near Bailey's Key off the north coast of Roatan. Most pinnacles are narrow, steep promontories rising off sandy bottoms. They are capped with colorful corals and sponges.

Along sandy shelves at the base of the deep drop-offs and in sand slopes leading to the drop-offs, are shallow and deep eel gardens—wonderful to see but difficult to photograph. At the tops and sides of deep reefs and in some shallow coral gardens it is common to see large schools of blue tangs, endless parades of creole wrasse or blue chromis. Also common are schools of barjacks and Bermuda chubs. Unusual numbers of beautiful royal grammas and black cap basslets are found at mid-depths and attractive indigo wrasse and yellow coney are common in shallow waters.

As deep and shallow are close together it is not unusual to see spotted eagle rays, schools of bonito and jack crevalle over the reefs. Also somewhat common are paired barjacks and Spanish hogfish swimming together in some contract of silent trust.

Bay Island's shallow reefs are prolific

and well formed. All but two or three of the 65 species of Caribbean corals have been identified here. Some shallow areas along Roatan's south shore are so pretty they are often called coral gardens. Conspicuous and frequent are the well formed stands of pillar corals better developed in Roatan and Guanaja than perhaps any area of the Caribbean. Off Bailey's Key on the north side of Roatan is a formation of pillar coral nearly 10 feet tall and 25 feet in diameter at the base.

In the Cochinis Cays are huge colonies of blue bell and deep purple tunicates. Blazing in royal hues, these beautiful bouquets of fairly advanced marine animals rival the spectacular floral displays of the rain forests above.

Considerable excitement has been generated recently with the report of live, healthy bull sharks found sleeping in caves and ledges on the south side of Guanaja. This makes good sense as this is in the same general part of the Caribbean as Mexico's Yucatan Peninsula, where they have been previously reported. As of this writing no photographs have been taken. You could be first.

Even more rare are the infrequent reports of whale shark sightings. Julio Galindo, owner/manager of Anthony's Key and an avid deep water fisherman, has had one alongside his boat twice this past year. Chuck Kafer, AKR's resident

photo pro, has one encounter on video tape. For years the fishermen of Utila and the Sahsa and Lansa DC-3 pilots have reported seeing whale sharks in the triangle between Utila, Cayos Cochinos and the west end of Roatan. I spent two days looking with no results.

The probability of unusual encounters of the marine kind are part of the Bay Islands adventure. The ingredients are there; an extensive area with little traffic and an excellent assortment of marine life living in deep and shallow areas.

ANTHONY'S KEY RESORT

Picture perfect! ANTHONY'S KEY's wooden bungalows scatter across a picturesque islet (formerly a coconut plantation) and continue to stair-step up a verdant hillside on the main island. There are 44 in all, arranged in doubles, triples or quads. Perched on the hillside, the main house overlooks this plantation style retreat and its quiet lagoon. One-half dozen dive boats (five, 40 footers) all well equipped for service, are poised at the dock ready to load for the next dive.

There are more than 30 dive sites including: the **Bear's Den**, a winding cave or cavern dive beneath a coral reef; **Half-moon Bay Wall** featuring colorful sponges; and **West End Wall**, perhaps the best wall dive in the Bay Islands. A full slate of ancillary activities includes a daily

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social volleyball game between guests and staff; tennis; windsurfing and sailing in the lagoon; an island taxi tour; and, once each week, the West Bay Beach picnic with its spectacular setting on an expansive white sand, palm lined beach, a one-half hour boat trip from the resort.

Underwater photo pros Charlie Kafer and Barbara Gent offer instruction, daily E-6 slide processing and feature a video production service, the only one of its kind in the Western Caribbean.

New this year is an island casino complex featuring Casino Royale (blackjack, roulette, slots, etc.) wisely placed a short distance from the resort. Also included in the same building is the Splash Dance island disco and a tropical restaurant with an outdoor view of the lagoon. Offering tempting hamburger and pizza dishes, the new restaurant shares duty with the traditional mainhouse restaurant for dinner service.

The resort is well kept, well managed and has a high rate of returning visitors. Anthony's Key continues to be the leader in size, amenities and popularity in the Bay Islands.

COCO VIEW RESORT

Bill and Evelyn Evans, Doc Radawski and crew continue to run COCO VIEW, one of the best dive resorts anywhere. Currently it is the second most popular in the Bay Islands. Adventurers Bill and Evelyn discovered Roatan six years ago and built the resort almost from the ground up. At every turn there are details that underscore the basic theme: CoCo View is a resort run by divers for divers.

The screened main building houses the restaurant, kitchen, bar, briefing room, recreation room and reference library. The two, two story guest houses have 16 rooms that are clean and comfortable. CoCo View's "front porch" is probably the best shore diving in the Bay Islands. Out in front is the **Prince Albert**, a classic 140 foot freighter wreck sitting upright like a Hollywood movie set and more than one mile of wall diving all within snorkeling or scuba distance from shore. Nearby are at least two more wrecks plus excellent pinnacle and wall dives galore. The magnificent **Mary's Place** attested to earlier in this article is not far away. CoCo View has initiated a progressive mooring program with cement anchors and floating pots—11 moorings and 16 dive sites. The 40 foot *Miss Pat*, a twin diesel dive boat, places 30 sites within one-half hour of the resort's expanded dock. The 43 foot motor sailer, *Reef Runner*, features a one week surf and turf combo with three nights aboard and four nights at the resort for a group of eight people. Doc Radawski, head instructor and dive operations manager, is a walking encyclopedia of island lore and the coordinator of the Bay Islands diver rescue network.

New this year is a 100 foot dive support/dock area, new all-electric 17 cfm compressors and a pretty little gazebo

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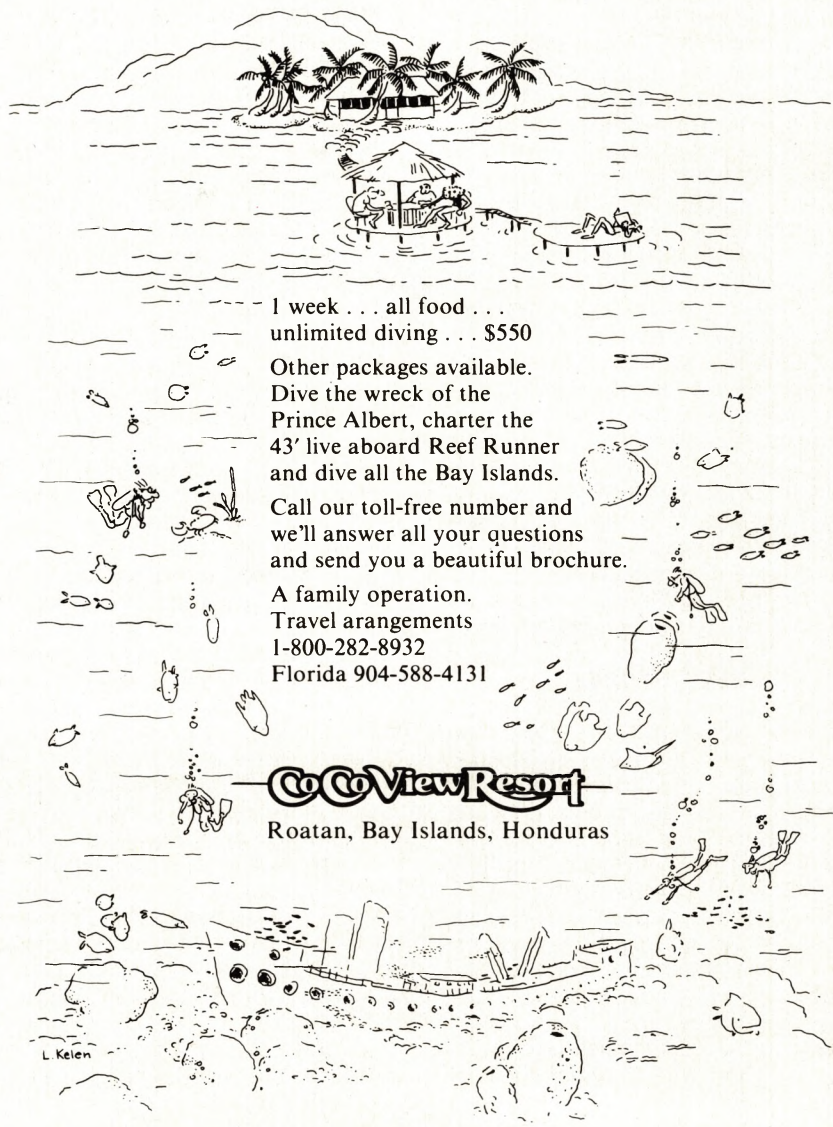


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BAY ISLANDS

constructed at the end of a breakwater in front of the resort. High scores on diver support, family atmosphere and shore diving are assurance of future success for CoCo View.

CARIBBEAN SAILING YACHTS

Only three miles from the Roatan airport in a sheltered mangrove cove known as Brick Bay is the impressive CARIBBEAN SAILING YACHTS development. Nothing in the Bay Islands comes so close to a country club atmosphere as CSY. It is a unique and distinctive property with its beautiful big freshwater pool and row of 10 handsome 44 foot sailing yachts at the dock. Twenty modern well equipped rooms and a handsome bar help you feel comfortable between diving sojourns. The CSY concept also includes a full service marina, restaurant and gift shop on premises.

At CSY you can charter your own sailboat with tanks aboard and plan your own dives or opt for the standard package and make one, two or three dives per day aboard the 36 foot twin diesel custom dive boat. One day of sailing is included as an option in the regular dive package. Almost any combination of sailing/diving days can be arranged within the basic eight day/seven night package.

General manager Marco Galindo and dive operations manager Alvin Jackson list more than 40 dive sites that can be reached within 20 minutes of the CSY dock. These include areas of heavy shallow coral growth, beautiful walls with a variety of sponges including a rare white vase sponge and huge canyons, caverns, fissures and caves usually only minutes away. Caribbean Sailing Yachts is the closest dive resort to the famed Mary's Place and with its flexible sailboat options and resort appeal it's an ideal choice for individuals and small groups seeking flexibility and ambiance. It is currently the third most popular dive resort in the Bay Islands and growing steadily.

REEF HOUSE

As the name implies, the REEF HOUSE sits literally on a reef flat in front of the coastal town of Oak Ridge on Roatan. You can walk out of your room with a tank on your back and snorkel or scuba out to the reef and drop-off only 300 yards away. The Reef House is actually the oldest dive operation in the Bay Islands, although it has been closed a couple of times owing to changes in ownership and management. It is currently owned by a consortium and operated primarily as a dive resort.

The rooms are comfortable and pleasantly furnished with a combination of glass doors and wooden shutters to take advantage of the trade winds. Twenty to

25 divers are housed in three wings of a mainhouse, which also contains the dining room. An outdoor bar is at the end of one wing, attracting divers coming in from the reef. The entire front porch and bar area provides a panoramic view of the blue Caribbean.

The *Henry Morgan*, a 40 foot single diesel cruiser, is the main dive boat and it makes two trips per day to the south shore reefs. There is also a new 33 foot Morgan sailing yacht. It sleeps six and is used for day and overnight fishing, diving and sailing trips.

The proximity of Reef House makes it possible to run all day excursions to the **Barbareta Wall** and the pristine **Pigeon Cays**. There are excellent examples of reef fissures throughout Reef House's running grounds including **Calvin's Crack**, which cuts deeply into the south shore wall. There are more than 20 regular dive sites, unlimited day and night shore diving and beach picnic dive days to relish. The bonefishing is reported to be world class and dory rides throughout Jonesville and Oak Ridge will offer a look at coastal life in Roatan.

BARBARETA BEACH CLUB

The BARBARETA BEACH CLUB is a piece of wilderness adventure on a fantasy island. At BBC you not only have your own resort, but your own island as well—a 2,000 acre chunk of paradise between Roatan and Guanaja. The island was originally owned by descendants of Henry Morgan, but was purchased by Arthur Townsmire, Jr. of Mobile, Alabama. Its current lease/management team is promising to realize BBC's full potential.

The mainhouse, which sits on a beach overlooking the crystal sea, includes an 11 unit lodge with restaurant and bar. Rooms are comfortable and nicely furnished island style.

The diving almost directly out from the resort is absolutely fabulous and extensive. There are many miles of virgin walls and splendid drop-offs barely explored. Huge jewfish and infrequent sharks are reported along with schools of jacks, crevalle and bonito. The only area that is even partially explored is the **Barbareta Wall**, directly out from the resort and the adjacent Pigeon Cays, which are perfect for picnics, snorkeling and shallow scuba. Island exploration and hiking will take you through paths in the jungled hillside leading to natural caves that may have been inhabited by Payan Indians. There are many sculptured stone artifacts to discover in the bush.

Under new management, Barbareta Beach Club is an exciting opportunity for those seeking a wilderness experience without bare-bones accommodations.

BAYMAN BAY CLUB

The ambiance is unbeatable. BAYMAN BAY CLUB's natural wood bungalows sit upon a verdant hillside connected by

wooden steps and walkways and surrounded by a forest of beautiful fruit and flowered trees. The tri-level mainhouse looks like it's from *Swiss Family Robinson* and has a handsome and majestic setting above the lagoon. In front of the cottages and curving away from the wooden dock with its two story deck topped by an observation platform, is a classic crescent shaped beach fringed by a grove of slender palms.

BBC has recently refurbished or replaced its entire generator plant and has constructed a brand new dive shop, with two new compressors, off the main dock. Safari style mosquito netting has been installed above each bed and several rooms have fold-out Oriental beds for families who wish to stay together.

Day or night shore dives reveal a close hugging reef and a wide variety of potential macro portraits. The 40 foot *Nimitz* is the new dive boat and it makes the selection of more than 20 dive sites only a maximum of 30 minutes away from the dock. A full day's diving with lunch aboard will allow you to circumnavigate the island of Guanaja, often considered the most beautiful in the Bay Islands. Divemaster Beau Bush is a young islander with plenty of local experience and a pleasant, easy disposition. Don't miss the **Bayman Drop** for wall diving and **Black Rock** for exploring a labyrinth of volcanic caverns and tunnels.

If you have enough energy after diving, you can hike and climb directly behind the resort and to a path over the spine of a small mountain to a scenic coconut plantation or hike along a stream from the coast a short distance from the resort to a rain forest and a cascading waterfall.

A major asset is Bayman Bay Club's only liability. The club is small, only nine units (18 people); large groups may have to split up weeks. However, it may be the prettiest little dive resort in the world.

POSADA DEL SOL

When the Lifestyles of the Rich and Famous TV crew finally schedules a show in the Bay Islands it will most likely be at POSADA DEL SOL. It is a new entry to the Bay Islands diving scene and is certainly destined to make a splash. Formerly the \$4 million "private" hotel of a wealthy Canadian recluse, the resort looks more like a posh Spanish villa than a diver's retreat. There are 16 rooms, 62 acres of manicured grounds and 1,600 feet of oceanfront complete with tennis court, marina, pool and exercise room. The restaurant and bar areas are handsome and the room interiors, particularly in the suites, are the closest thing to luxury accommodations in these islands.

John Propeck, the new general manager and George Cundiff, the majority owner, are high on Posada's attractions and appeal as well as the miles of virgin and wilderness diving along Guanaja's south shore. There are already 35 known

dive sites including huge volcanic caverns filled with schools of silver minnows and ledges and caves harboring "sleeping" bull sharks. Close to the resort are two wrecks—a shrimp boat in 80 feet of water and a 65 foot pleasure craft 40 feet deep. Posada's dive crew has already established 10 permanent moorings on popular sites.

The main dive boats are the 42 foot single diesel *Spanish Diver* and the 36 foot twin diesel *Isleña*. Tino Montoroso, one of the very best dive guides in the Bay Islands and a veteran of 12 years of leadership in Roatan, is the personable and capable dive operations manager.

Additional activities include windsurfing, sailing and island sojourns. Unlimited shore night diving and exploration dives along the drop-offs are featured at this rich retreat available at attractive, competitive package prices.

CAYOS DEL SOL


At CAYOS DEL SOL (formerly Plantation Beach Resort) new owners and managers have improved everything from stateside marketing and communications to the properties at the resort.

That's all that was needed here. What has existed on the island was nearly perfect. Cayos del Sol is the only dive resort in the Cochinis Cays, between Roatan and the Honduras coastline. It is a piece of tropical perfection sitting within a group of islands, most so small you can walk around them in a day.

This is a location where you will feel properly adrift in total blissful ignorance of the rest of the world and its problems.

Cayos is on the west side of Cochinis Grande, only 0.6 square miles in area. The mainhouse is cradled in a valley surrounded by a tropical rain forest. In the valley are individual resort units surrounded by frangipani, wild orchids, hibiscus and pineapples.

The *Captain Robinson*, a 42 foot steel hulled boat, can comfortably accommodate 18 people on three trips per day to a wide variety of sites and attractions. There are more than 30 regular dive sites but there are two special attractions that can't be missed: the magnificent colonies of purple tunicates, found in greater abundance here than almost anywhere in the Caribbean, and the infrequently traveled fishing banks a few miles out from the resort. The aforementioned **Roatan Bank** has never failed to excite.

Fortunately, Jim and Gae McDonald and family will continue as resident managers at the new Cayos del Sol. They are young, aggressive, friendly, down-to-earth and exceedingly talented at keeping this place humming. From their island lore to their kingfish steak cookout, the McDonalds are the perfect hosts for a memorable week in a tropical heaven. Cayos del Sol is a place that you will visit once and want to return to for the rest of your life. 



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Technifacts

BY E.R. CROSS



Readers continue to provide interesting comments and questions and informative answers to those questions. These are the most important constituents of Technifacts. For me there is a bonus in the excitement of meeting new divers via SKIN DIVER and being able to serve as an intermediary between divers in a quest for information and those who can provide it. This month Technifacts will again function in that role.

U/W ARCHAEOLOGY DEGREES

Several readers wrote regarding the Technifacts in which information was sought regarding schools that granted degrees in underwater archaeology. A letter from Anne G. Geisecke, Arlington, Virginia, summarized the essential content of all the letters received. She wrote, "As usual I enjoyed your June Techni-

facts. As far as schools go, the only two that currently offer degrees in underwater archaeology are: East Carolina University, Greenville, NC 27834, (919) 757-6883—Dr. William Still; and Texas A & M University, College Station, TX 77843, (713) 845-5242—Dr. George Bass." Some readers also mentioned briefly what Anne pointed out, "Many schools offer anthropology or history degrees that allow one to construct a program in U/W archaeology. There are also many summer school courses that are open to any student and allow a person to try the field work before committing to a degree program. These field schools usually advertise in fliers sent to anthropology departments. One could contact one's local school for more information."

Another reader stated, "Texas A & M has a very large and well known marine

archaeology graduate program with several top researchers involved in it. Current projects (June 1986) are ongoing off Turkey and Jamaica. Applicants from many varied undergraduate programs are also accepted. Also, undergraduates in the school's anthropology/archaeology programs can take marine archaeology courses and participate in some of the previously mentioned ongoing projects."

UNDERWATER FILMS—AGAIN

Quite a few readers wrote providing additional information on films mentioned in previous Technifacts that had underwater footage and diving scenes. Also, some readers provided names of additional, similar films. Some of the reports are of interest. At the risk of seeming to be a film review column the informative

(Continued on Page 114)

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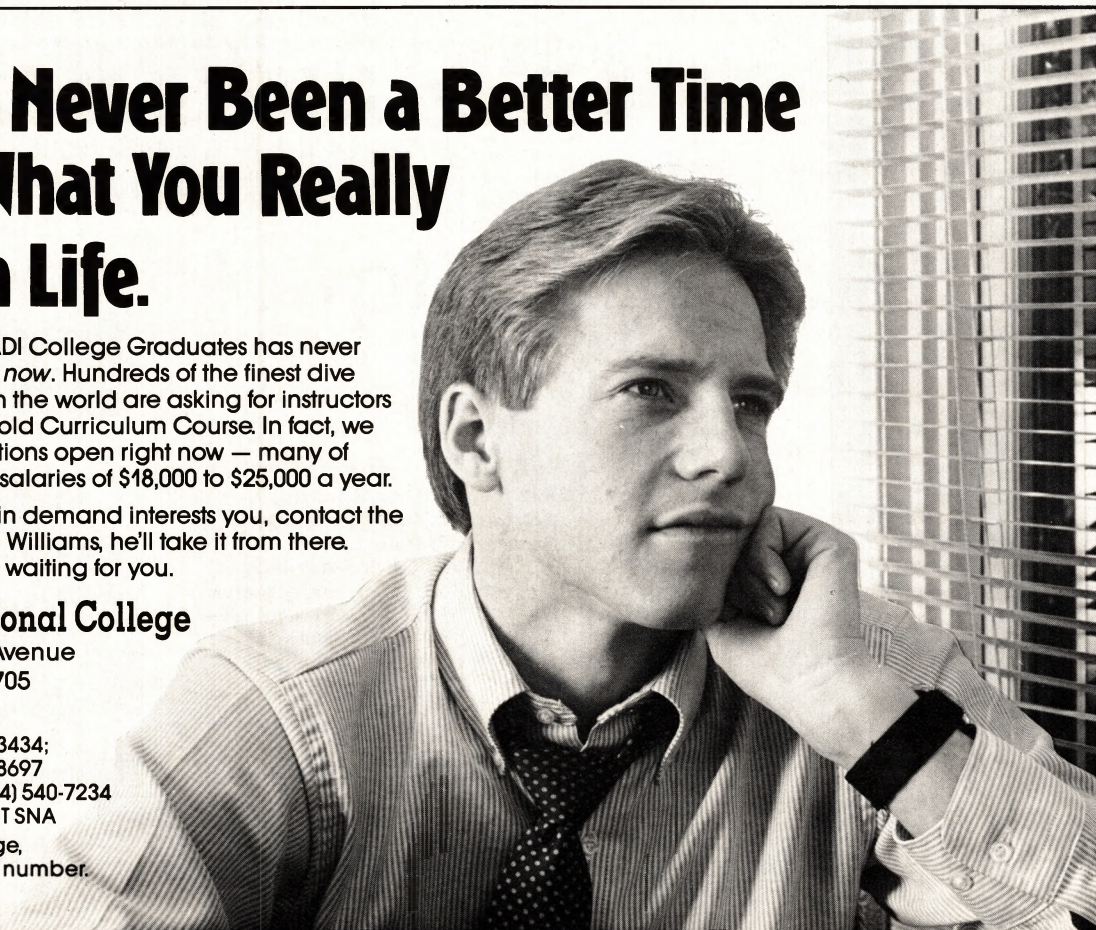
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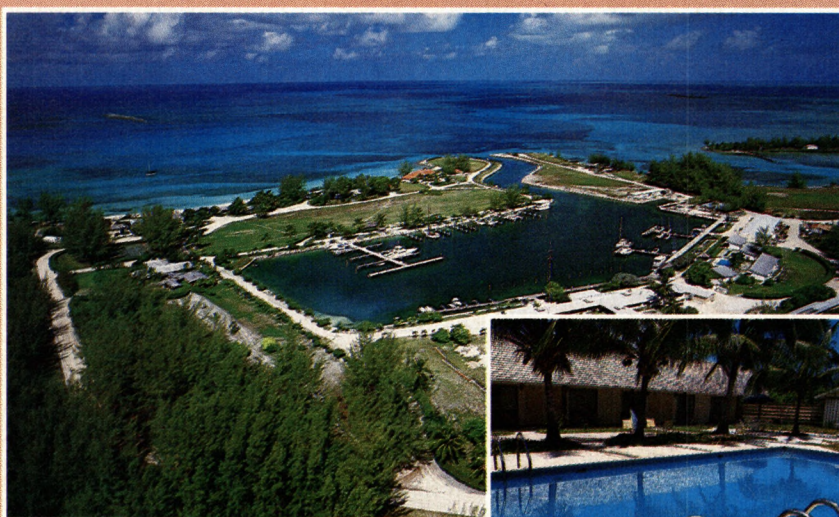
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SECTION



CHUB CAY A Bahamas Fish Watcher's Paradise

TEXT AND PHOTOGRAPHY
BY STEPHEN FRINK



Sport fishermen and tournament anglers were the first to discover the unique charms of Chub Cay. For more than 25 years they have been visiting this picturesque Bahamas Family Island resort just 125 miles from Fort Lauderdale.

Here, the crystalline waters of the Tongue of the Ocean—an immense deep water chasm that runs between Andros and New Providence Islands—meets the shallow Bahama Bank, forming a depository for pelagic and reef marine life. The baitfish are washed off the flats by the tides and blue and white marlin, sailfish, wahoo, dolphin and yellowfin tuna congregate to feed on them. The surrounding cor-

al reefs are rich with superior bottom fishing for grouper, snapper, barracuda and amberjack. Further fishing incentive is provided by the huge flats, world famous for their populations of permit and bonefish.

This combination of magnificent underwater visibility, rich and diverse marine life and beautiful coral reefs is equally attractive to the sport diver. With the collaboration of Neal Watson's dive operations expertise and the convenience of the Chub Cay Club, traveling divers now have a first class support facility to allow the sampling of this U/W wonder.

Chub Cay is the crown jewel of the Berry Islands chain, a grouping of 30

palm-lined cays stretching in a 30 mile arc just 30 miles from Nassau. The Chub Cay Club is a totally self-contained resort with its own electric generators and water desalination plant, a 76 slip marina with nine foot draft channel, a 5,000 foot runway with customs Port of Entry, two lighted all-weather tennis courts, two freshwater swimming pools, a fuel dock, laundry, screened fish cleaning room, restaurants and lounge, and a well-provisioned commissary. The resort has facilities for Chub Cay Club members, as well as a 24 room hotel catering to non-member tourists.

The hotel is just steps away from the dockside dive shop operated by Neal Watson's Chub Cay Undersea Adventures. The hotel rooms are clean and spacious. They feature air-conditioning, satellite color TV, refrigerator and private bath. With the swimming pool just outside the door and the Flying Bridge restaurant and lounge directly adjacent, the whole dive/lodging complex is especially convenient. Diver convenience has been the trademark of Neal Watson's Undersea Adventures operations in Bimini and Andros and that same dedication to service is evident in Chub Cay as well.

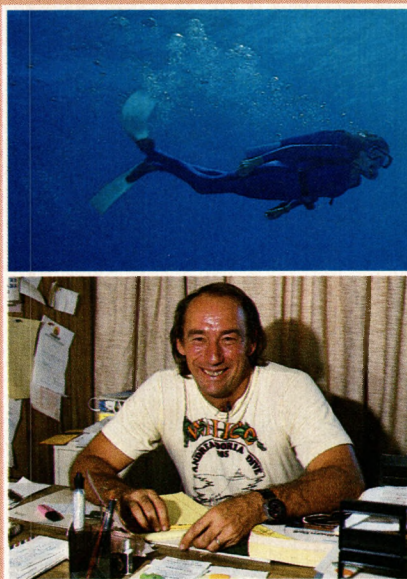
Neal made his mark early in the dive industry with daredevil exploits such as diving to 437 feet on compressed air and swimming the 50 miles from Bimini to Florida nonstop underwater on scuba—both world records. His efforts today, however, are directed toward developing top quality dive resorts. There are conceptual similarities in all three Neal Watson Undersea Adventures resorts, such as a dedication to providing the maximum amount of dive time to their guests, including three dives daily and scheduled night dives. The Undersea Adventures dive vacations are com-

travel

pletely packaged for guest convenience. One phone call will arrange air transportation, hotel, meals and diving, even gratuities and ground transportation. There are no surprises or hidden charges in the reasonable package rates. The only additional expenses that might be incurred are bar bills, souvenirs and a \$5 Bahamian and \$3 U.S. departure tax. At all three locations the staff members are friendly, qualified professionals; the boats are designed to optimize diver comfort; there is ample compressed air for tank fills; and double or triple redundancy for anything that can possibly break. This level of dependable service keeps at least 50 percent repeat clientele traveling within this circle of resorts.

The dive facilities at Chub Cay include a large dockside dive shop with two 17 cfm air compressors—with 10,000 cubic feet of air storage—and more than enough rental gear to handle the hotel's full occupancy. The dive boats include a 28 foot custom fiberglass V-hulled diesel and a 40 foot wood and fiberglass boat renovated for diver service. The tanks stay on the boats with a manifold system to provide air fills. Guests need never lug tanks. A gear storage area is provided at dockside so that U/W cameras are the only equipment that need be carried from the hotel rooms.

Chub Cay is very definitely targeted to the convenience of the underwater photographer. There is a photo center featuring classroom area, an automated E-6 film processor (for Fujichrome and Ektachrome), color print processing and underwater video services. Frazier Nivens is the affable and knowledgeable resident pro at Chub Cay. His qualifications include the ownership of a photo studio in Tennessee and a stint as the photo pro at Rum Cay. At Chub Cay Frazier functions as both dive instructor and photo pro. He offers certifications from resort course through divemaster and underwater photo services such as daily instruction, film critique (on request only), underwater video production, guest portraiture and evening slide presentations. A fleet of Sea Rider U/W propulsion vehicles is also



Above: Cindy Gray with Atlantic spadefish. Left: Neal Watson of Chub Cay Undersea Adventures. The dive shop is just steps away from the hotel.

available to divers on a rental basis.

One of the most significant convenience factors to Chub Cay diving is its proximity to the best of the dive sites. Many are within ten minutes of the dock, but there is also considerable exploration underway to expand the dive itinerary. A week's dive vacation will often include an excursion to Joltier's Cay; trips to Whale Cay, Rum Cay and Diamond Rocks are frequently scheduled as day trips. On just such a day-dive outing we experienced a truly magnificent dive at Pelagic Pinnacle. Near Rum Cay (not to be confused with the other Rum Cay in the Southern Bahamas), the Pelagic Pinnacle is an aberration in the 90 foot wall face along the Tongue of the Ocean. The wall begins in about 50 feet of water and then drops quite vertically to 6,000 feet. The divemasters learned of this site from the fishermen who typically record huge schools of fish on their depth finders at this spot. We have found it especially productive for bottom fishing. We experienced visibility of at least 150 feet; eagle rays cruising by in squadron formation; schooling barracuda, horse-eye jacks, grouper, snapper and even a hammerhead shark off in the gloom of the depths. Apart from the fascinating fish life at Pelagic Pinnacle, the bottom terrain includes tube and encrusting sponges, whip corals, gorgonians and even black coral beneath the overhangs as shallow as 65 feet.

The basic dive profile of the reefs adjacent to the Chub Cay Club includes a wall that begins at 80 to 90 feet and falls precipitously into the abyss of the Tongue of the Ocean. There is an intermediate reef in 40 to

60 feet of water characterized by healthy coral formations and rich fish life, as well as a shallow reef with sand channels at 20 feet and high profile coral heads nearly awash at low tide.

There are scores of dive sites along the Chub Cay Wall. While each features its own unique attraction, the dives bear many similarities. Aside from the sparkling water clarity, the frequency with which eagle rays are sighted has become almost a Chub Cay trademark. Other pelagic species commonly seen along the wall include turtles, barracudas, amberjacks and occasionally, blackfin tuna. Orange elephant ear sponges provide dramatic color accent and the filigree of black coral provides texture.

The intermediate reefs are especially popular with underwater photographers. There are dense configurations of high profile corals of either honeycomb or spur and groove configurations, hosting a tremendous variety of Caribbean fish and invertebrate life. Canyons and Caves is one of the more popular examples of this. On the backside of the primary reef structure is an extensive sand flat in only 15 feet of water. Here, flounder, stingrays, starfish, conch and permit may be encountered. This abuts a fairly vertical coral face dropping from 20 to 40 feet with huge isolated coral heads to seaward. It is the dense fish populations that make Canyons and Caves a superior dive site, however. Schools of Bermuda chub, chromis and spadefish cruise the midwater, while angelfish, glass minnows, grouper, sergeant major, bigeye and squirrelfish occupy the coral crevices.

(Continued on Page 115)

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BARBADOS A LAND BEYOND



CAYMAN'S EDGE PROGRAM

TEXT AND PHOTOGRAPHY
BY GERI MURPHY

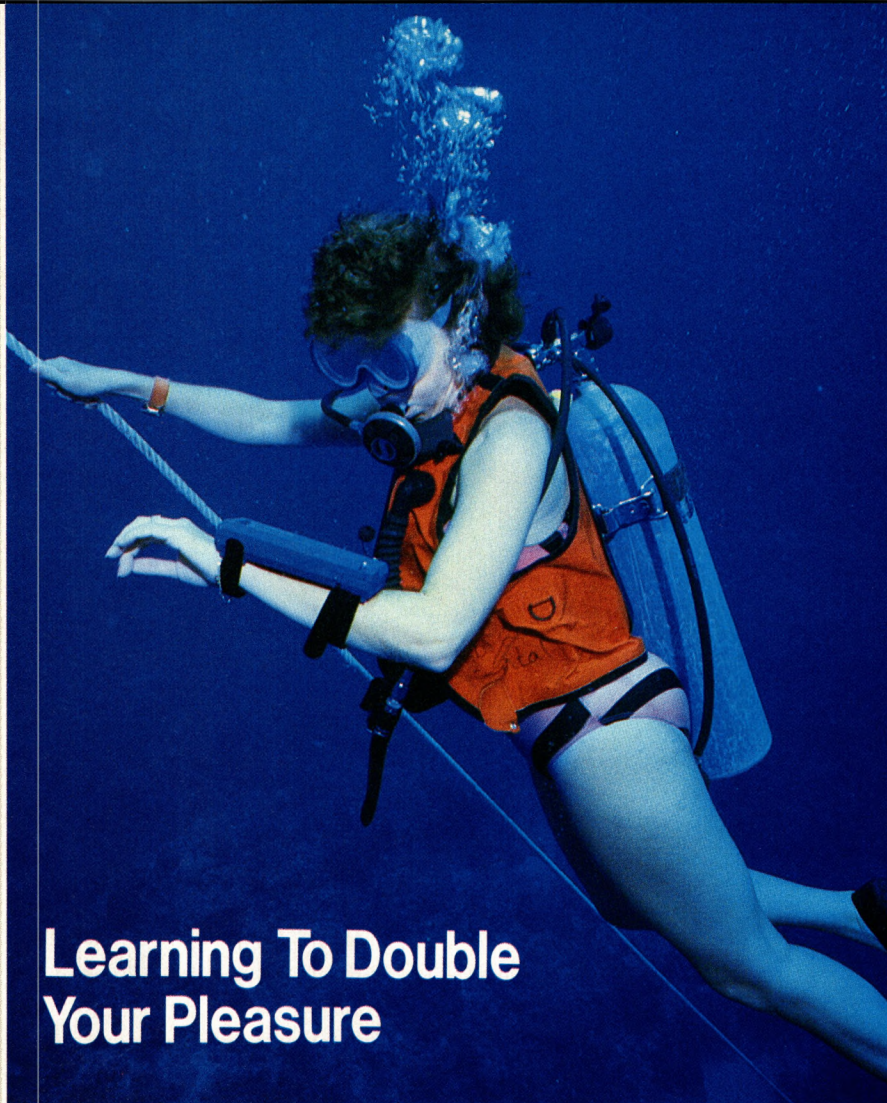
Class starts early in the morning. A special dive boat knifes through the glassy calm water and noses up on Seven Mile Beach. A small group of experienced divers steps aboard and the craft slips away from shore. Ten minutes later the instructor gives a lecture on using a computer for multi-level diving.

The group makes a dive on Trinity Caves to a depth of 110 feet and resurfaces 25 minutes later. The divers rest aboard the boat for 42 minutes while the craft moves to another location. A second wall dive at Sand Chute is made to a depth of 110 feet for another 25 minutes. The group is back on board the boat by 11:00 am, heading for shore.

The benefits are obvious. This group has just learned to use the Edge diving computer and completed two days of wall diving in a single morning. Many graduates of this unique class are so impressed with the Edge's performance they immediately make arrangements to purchase their own!

SOTO'S NEW PROGRAM

Who is conducting this unique advanced diver program? It's Bob Soto's Diving Ltd., Grand Cayman's oldest and most experienced dive operation. Recognizing the changing trends in dive vacation travel, Soto's just recently instituted several innovative programs for experienced divers. The organization now offers special North Wall dive trips three times weekly, night dives combined with a night owl dinner menu twice weekly and special photo buddy trips. But its most unique offer is an Edge training program that is combined with a double deep dive



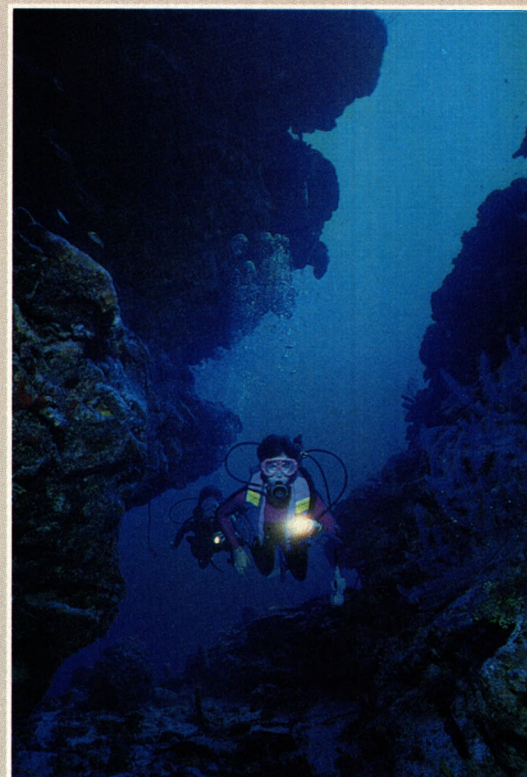
Learning To Double
Your Pleasure



on Cayman's fabulous wall. With these new programs added to existing ones, Soto's now offers a two-tier program, thereby serving both beginning and experienced divers. Soto's has also reconfigured its dive boats for smaller groups and far more personalized service. Boats carry a maximum of 20 divers per trip. According to owner Ron Kipp, "As far as I am concerned, the cattle boat

on Cayman's fabulous wall.

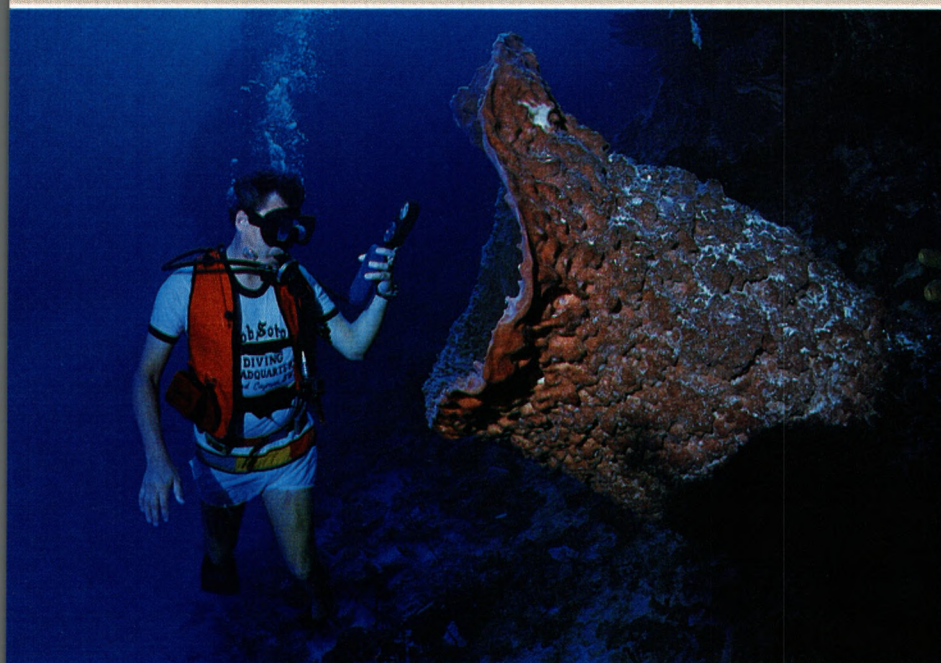
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Left: Bob Soto's instructor Jay Ireland checks Edge units prior to a training dive. As an added safety measure, brief decompression dives are made at 20 and 10 feet: A diver is shown timing her stop with the Edge. Divers board the *Discovery* for Edge dives at 8:30 and 11:30 am on Seven Mile Beach.



Above left: Edge divers descend to a maximum of 110 feet for 25-30 minutes at Sand Chute. Above: Exploring Trinity Caves. Left: A surface interval means time for relaxation. Bottom left: Bob Soto's owner Ron Kipp checks his Edge near a sponge at Sand Chute.



tographers and advanced divers. The name of the product is an acronym for Electronic Diving Guide.

Once switched on, the Edge is totally automatic. It is a non-programmable computer (you don't have to enter data), with 15 separate functions. In other words, it does all the work and the diver receives all the benefits. A large display window provides a cornucopia of diving information such as: continual depth tracking, maximum depth, water temperature, bottom time remaining without decompression, total bottom time for dive, nitrogen uptake in the diver's body and much more.

The major benefit of the Edge is its revolutionary decompression program. This device operates on a multi-level decompression principle, precisely tracking the diver's depth and time for the entire dive. It records and integrates nitrogen absorption for the entire range of depths and times experienced during descent and ascent. The Edge is continually calculating and recalculating nitrogen absorption regardless of whether you go up, down, or remain at the same level for the entire dive. The resulting benefits are longer bottom times for wall dives and shorter surface intervals.

days ended in 1981. These programs will make history into the 90s."

The Edge program was launched this past July after a year of careful research and testing. The Soto's staff of eight dive-masters has made a total of 5,000 Edge dives without a single mishap. As a result, the company purchased more than 20 Edge units for their new training program and daily use by the dive-masters.

ABOUT THE EDGE

By now you may be wondering, "What is an Edge?" This unique device is a miniature, independent dive computer that can be worn on either the diver's forearm or pressure gauge hose (with an Edge holster). It is the only product of its kind in the world today and has been rapidly gaining acceptance by professional divers, scuba instructors, underwater pho-

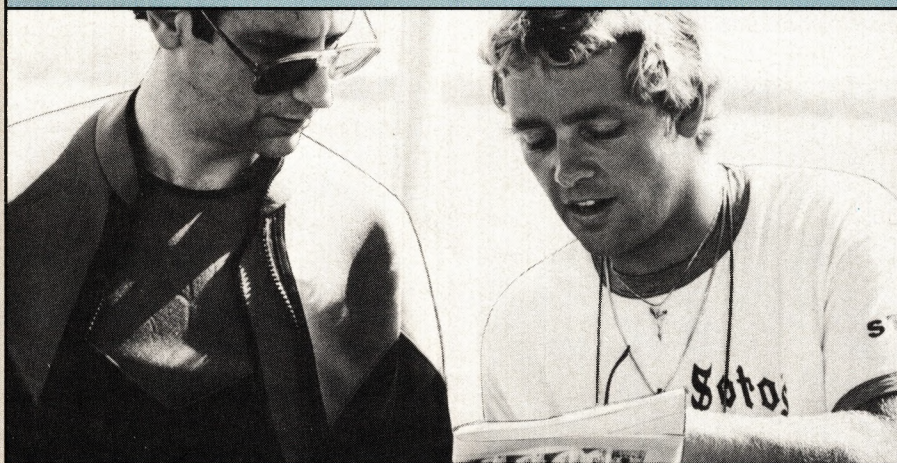
DIVE THE EDGE Electronic Dive Guide

DOUBLE DEEP
WALL DIVE
PROGRAMME

EVERY TUESDAY
THURSDAY
SATURDAY



Above left: Edge dives are conducted every Tuesday, Thursday and Saturday. Above right: Ron Kipp checks a passenger manifest with the crew of *Discovery*. Below: Instructor Jay Ireland explains the Edge display window to a student.



CAYMAN'S EDGE PROGRAM

While the Edge is very easy to use, it can be intimidating at first glance. The device does so many different things most people are overwhelmed by the information contained in the operating manual. Hands-on instruction is the easiest and most efficient way to learn how this computer works.

EDGE CLASS

Soto's new Edge training program is fairly simple and straightforward. Divers can understand the basic functions by the end of the second dive. Soto's approach

is "learn by doing."

Edge dives are conducted aboard the *Discovery Diver* every Tuesday, Thursday and Saturday morning. The trips depart Seven Mile Beach at 8:30 am and return by 11:15 am. Divers are loaned an Edge for the session and training is almost on a one-on-one basis. Classes are kept small and very personalized. Once anchored at the dive site, Edge instructor Jay Ireland delivers a simplified seminar on the basics of multi-level decompression and how the Edge keeps track of depth, bottom time, surface intervals, etc.

The dives are limited to a maximum of 110 feet with a total surface-to-surface time of 25 to 30 minutes. The divers descend to the deepest point of their dive and then begin working their way up the wall. The sites are spectacular because of the vertical profile and magnificent marine growth. As an added safety measure, the divers take brief decompression stops at both the 20 and 10 foot levels.

Upon reboarding the vessel, the instructor reviews the divers' profiles and how the Edge is tracking their times and depths. A 42 minute surface interval provides time for setting up another full scuba tank, resting and becoming more acquainted with the Edge functions.

The second dive is at another equally beautiful wall site. By now the divers are really paying attention to their Edges. At the completion of the second deep dive, safety stops are taken at the 30, 20 and 10 foot levels. Students are cautioned not to push the Edge to its limits. They are instructed to always maintain a one pixel bar gap between the black dots (representing nitrogen) and the no decompression limit line. As Ron Kipp explains, "We dive the gap, not the edge."

The benefits of this program are many fold. Divers have an opportunity to learn the correct use of the Edge from experienced instructors. They also have the opportunity of trying an Edge before purchasing one. Best of all, they get two days of wall diving in a single morning and still have the rest of the day to relax.

WHO QUALIFIES?

Soto's new Edge diving program is regarded as an advanced diver activity. In order to enroll, divers must qualify by meeting five basic prerequisites and they must be certified divers with prior wall diving experience. Most applicants have already made a wall dive with the Soto's divemasters the previous day.

Applicants must be able to clear their ears and make a descent to the anchor-line in three minutes or less. Divers must have a basic understanding of underwater hand signals including: up, down, OK, how much air left, etc. Divers must demonstrate buoyancy control skills because this becomes especially critical at the 100 foot depth. They must also demonstrate a normal air consumption rate. A typical wall dive in Cayman can be done with approximately a 2,000 psi air supply. Divers must also be able to keep their ascent rate to 20 feet per minute.

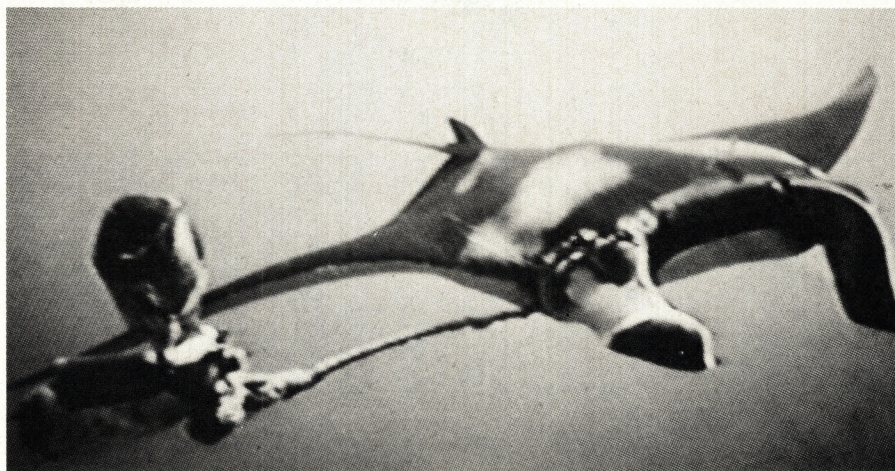
The cost of an Edge dive is \$60 per person, which includes the use of the Edge and two wall dives. For more information and reservations contact Bob Soto's Diving Ltd., P.O. Box 1801, Grand Cayman, BWI; telephone (809) 949-2022.

A SYMBIOTIC ENCOUNTER BETWEEN MAN AND MANTA

TEXT AND PHOTOGRAPHY
BY JERRY SCHNABEL

Rare indeed are close encounters with large, pelagic marine life. Hasn't every diver fantasized about the sudden appearance, right out of the deep blue, of a great whale, dolphin or a giant ray? Fifteen divers, including myself, turned that fantasy into a reality on a recent video dive off the island of Bonaire. While underwater at a northern site called Thousand Steps, we were visited by a giant (ten foot wing span) manta ray. Not only did we see the manta, we also had a chance to befriend and rescue it.

Sleek, silent and serene, the giant Atlantic manta rays travel the ocean in search of plankton, their primary food supply. Harmless to man, they are seldom seen by divers. Their enormous wingspan and graceful movements more resemble the star ship *Enterprise* than



This photo, made from video, shows the helpless manta entangled with rope and debris.

their shark cousins. Called devilfish by superstitious fishermen, these creatures do have two pronounced, hornlike appendages, which earned them their nickname. The devilfish is not only friendly toward man, but, in times of stress, may seek him out for a special rescue effort.

Our dive group was in the water and I was videotaping a guest, lighting up the beautiful wall. As I turned to continue along the wall, I stared into the blue water, expecting an empty void. Instead, a giant manta appeared, on a steady course—heading my way! I raised my camera and began to record the mo-

ments that later would unite the divers of Bonaire toward a common goal. The manta grew larger in my viewfinder until only its eye and horn were filling the image area. It passed overhead, turning and coming back for more slow passes around me.


I moved with the manta, adrenaline flowing, electrified by the experience. Camera rolling, I touched it and rode on its back toward the other divers. Perched on top of this mighty animal, I noticed a deep gouge on its right horn and a rope embedded one inch into its flesh. Trailing on the rope were three one gallon jugs

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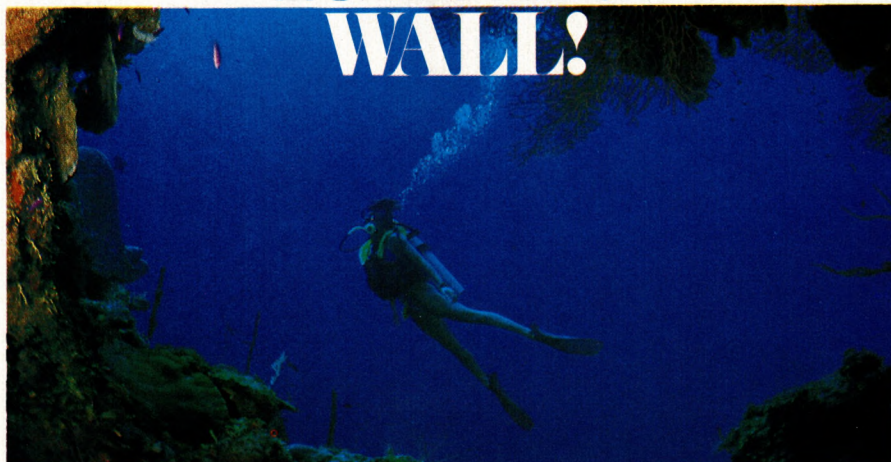
The Enchanted Island

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filled with water, creating an enormous drag and damaging the manta's underside as they pounded against its flesh.

I continued to record the manta's plight, while signaling to the other divers for a knife. None of them had one. Consequently, we were unable to free the manta. I tried to untie the rope and was unsuccessful, the manta left us.

As a photographer, I felt exhilarated by the incredible footage I had just acquired and, as a diver, I felt crushed I was unable to help the ray.

As we loaded the tape into the VCR at Photo Bonaire, divers poured in to view the footage. There was silence as the tape played, everyone aware the manta could not continue forever with such a burden. Its right eye was swollen shut because of the tightness of the rope and the manta was having difficulty turning in the



John Martin and Susan Karlin with debris taken off the manta. (Photo from video.)

direction of the obstruction. It was apparent to us the ray had sought our help.

Along with other members of the Dive Bonaire staff, I encouraged divers traveling to the northern dive sites to carry knives. The other dive operators of Bonaire were informed of the manta's plight and one could feel a camaraderie developing in our determination to free the manta from its burden. Bruce Bowker of the Carib Inn recounted a similar experience that happened two years ago and theorized the manta would again seek the help of divers.

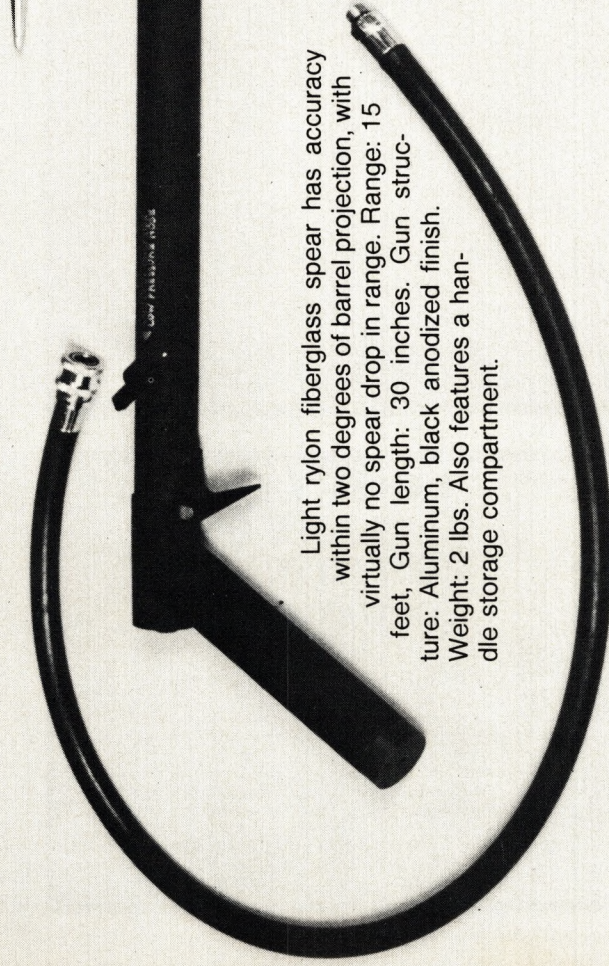
Just four days after viewing the video, Flamingo Beach Hotel guests John Martin and Susan Karlin cut the ropes and freed the manta. Imagine the thrill they experienced in being able to help such a beautiful animal in its time of need. When John retrieved the objects taken off the manta, they appeared to be floats from a fishing net.

In my mind, this will always remain a stunning example of how men and creatures from the wild share a common bond of freedom. For further information about the video footage, contact Jerry Schnabel, Photo Bonaire; Flamingo Beach Hotel, Bonaire, Netherlands Antilles.

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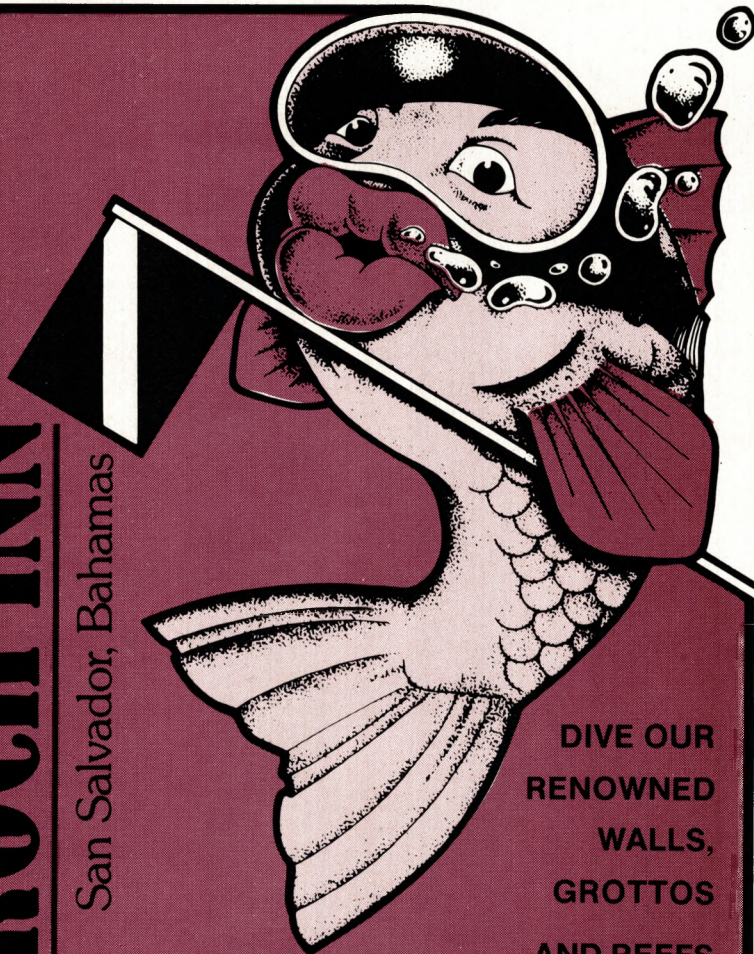
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NEW PROVIDENCE DIVERS

Nikon Inc. division marketing manager, Richard LoPinto and his daughter, Jennifer, recently visited New Providence Divers (NPD) near Nassau, Bahamas. LoPinto was taking the opportunity to test the



Left to right: Stephen McDiarmid, Demetrius Humes, Richard and Jennifer LoPinto, Caleb Goodman and John Shuder.

newest development in Nikon's 35mm amphibious cameras while his daughter successfully completed her open water certification with PADI master instructor, Stephen McDiarmid of the NPD staff. The entire NPD staff joined in the celebration of Jennifer's certification. ✽

VIRGIN ISLAND FANTASY

Each year the British Virgin Island Diving Association sponsors an underwater scavenger hunt. The M/V *Island Fantasy* will be there in August, 1987. Gail and Bob Stafford of Underwater Safaris in Road Town, Tortola, will host the hunt and a big barbecue on Cooper's Island featuring prizes, surprises and fun.

Each of the four weeks of August 1987 will be a new and exciting adventure cruising the United States and British Virgin Islands aboard the *Island Fantasy*—diving the wreck of the *Rhone*, bathing in the labyrinth of the Baths at Virgin Gorda, visiting rum and sugar mill ruins dating back to the 1700s.

For information write Island Fantasy Cruises, 301 East Blue Heron Blvd., Riviera Beach, FL 33404 or call (800) 848-7632. In Florida call (305) 848-7632. ✽

KITTREDGE SUBS

Captain George Kittredge USN (ret.) recently returned from Nagasaki, Japan where he tested a two man K-350 L submarine for the University of Nagasaki. The first day's test consisted of obtaining surface operating data at Hayashikane Shipyard in Nagasaki Port. The second day was spent at sea 20 miles off Nagasaki, using the university's new 1,000 ton training ship *Nagasaki Maru*.

The submarine, named *Seibe* (ancient name for the city of Nagasaki), was first lowered from the training ship in an unmanned ballasted condition to 500 feet, after which Captain Kittredge operated the submarine at its standard operating depth of 350 feet, with the *Nagasaki Maru* standing by. ✽

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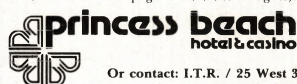


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MADURO/DIVI

Divi Hotels has appointed Paul Maduro director of operations for the islands of Bonaire and Curacao, Netherlands Antilles. A native of Curacao, he graduated from Cornell University School of Hotel Administration in Ithaca, New York, in 1974, and joined Divi Hotels the same year. In 1978, he left for a one year study course at the University of New Orleans Business School, rejoining Divi in 1980 as general manager of the Flamingo Beach Hotel & Casino on Bonaire.

Maduro's responsibilities as director of operations will include the Divi Flamingo Beach Hotel & Casino, Club Flamingo, Peter Hughes Dive Bonaire, Peter Hughes Dive Bonaire II and Peter Hughes Underwater Curacao.

Reservations and information can be obtained from recognized travel agents or Divi Hotels executive office (607) 277-DIVI or toll free (800) 367-DIVI. 🐠

SOTO'S PHOTO/VIDEO/BUDDY

Bob Soto's Diving, Grand Cayman has contracted with Martin J. Sutton to provide customer slides and video. The photo/video/buddy concept is part of Bob Soto's continued effort toward more personalized customer service. The program includes two days each week for underwater slides and one for underwater video. Customers on the morning two tank dive can view the results later the same day in the luxury of the Grand Pavilion Hotel's multi-media conference center. The 6:30 pm showings conveniently begin during the hotel's happy hour. Following a general slide or video presentation outlining Bob Soto's services and Grand Cayman, customers have an opportunity to purchase slides or video tapes. Private videos can be arranged. For information call Bob Soto's (809) 949-2022 or Kathie Kipp at (800) 262-7686 toll free. 🐠

SMALL HOPE BAY LODGE

In its 26th year of operation, Small Hope Bay Lodge, Andros, Bahamas, continues to offer exploration of the 140 miles of reef at its doorstep. The lodge is known for its wall dives, feeding of the fish and eels at The Barge, exploring the ancient ocean Blue Hole to 100 feet and many other shallow U/W gardens. It has now added another dive site.

On June 21, 1986 the *Marion*, a 100 foot long barge, was sunk in 70 feet of water at the Great White Sand Patch.

Small Hope Bay Lodge offers free scuba instruction for those wanting to learn, a hot tub under the stars, goombay smashes and hammocks under the palms. For reservations call, toll free, (800) 223-6961 or direct (809) 368-2014. 🐠

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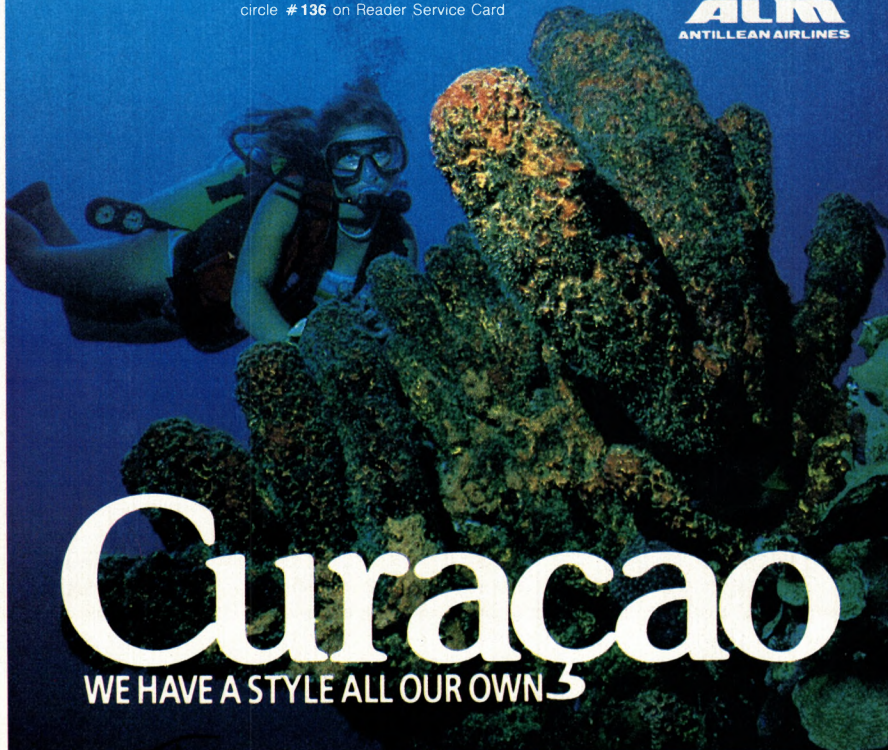
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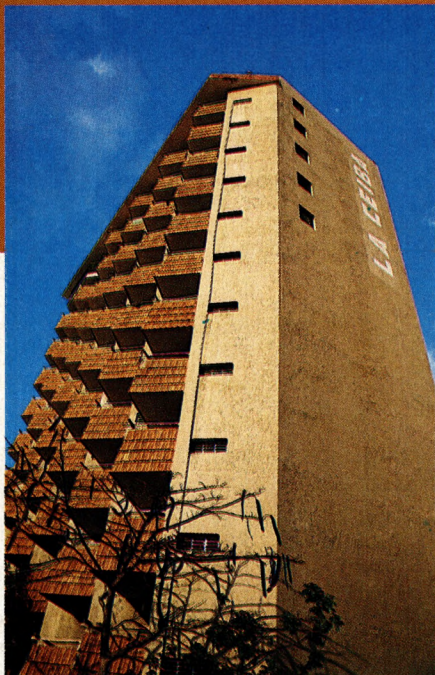
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LA CEIBA

Cozumel's La Ceiba Hotel is right on the beach and features two piers, a freshwater swimming pool and an outdoor restaurant. The beach diving area is enclosed with lines and buoys and freshwater rinse stations are within 20 feet of beach exits. Dive sites reached by boat offer shallow reefs and walls with clear water, big fish and a variety of hard and soft corals. The hotel's 115 rooms are evenly divided between a two story beachfront building and a tower that offers an excellent view.



Divers from the Lone Star State know it as *Numero Uno*. The rest of the country barely knows it at all. We're talking about Cozumel, a tiny island a few scant miles off the coast of Mexico's Yucatan Peninsula. Yet, in every SKIN DIVER poll we've taken in the last six years, Cozumel has been chosen among the three most popular dive destinations in the world. (Trivia buffs—the Bahamas

and the Cayman Islands round out the Big Three.) Your first visit to the massive reef structure on the southern tip of the island will confirm that Cozumel has it all: clear water, big fish, walls and a rich array of hard and soft corals.

It hasn't always been this way. The Maya, the first to vacation in Cozumel, didn't leave any diving artifacts, so we know they didn't visit the reef. Cortes

came in 1519, but he had gold fever and little inclination to dive. The next visitors were pirates Jean Lafitte and Henry Morgan, but they didn't stay long either. It wasn't until 1847 that 20 Mexican families began a fishing and agricultural village that, in the last 15 years, has blossomed into a unique diving destination.

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HOTEL

Cozumel's Luxury Dive Resort

TEXT AND PHOTOGRAPHY BY BILL GLEASON

service, Cozumel is extremely easy (and usually inexpensive) to get to. To understand the diving picture, you've got to acquaint yourself with a little geography. Cozumel is a rectangular island parallel to the Mexican coast. Although there are drop-offs all around it, the east coast, where the town is centrally located, is the lee side. The reefs that make Cozumel's diving world class are on the southeast coast, just before and after you get to that part of the island. Trouble is, the town was there long before the divers were; expect boat rides of 40 to 60 minutes to the best sites.

The closest resort to the reefs is La Ceiba Hotel, right on the beach several miles south of town. Built in 1977, this 115 room, full service hotel was designed and built for divers. It's got two piers, one for boat loading and the other for shore diving. The rinse stations are within 20 feet of your exit. The entire shore diving area (mostly patch reef, but perfect for warm-ups and night dives) is enclosed with lines and buoys and even has a twin engine plane wreck in 25 feet of water. There are several beaches, a freshwater

claims as a full service resort. The rooms are evenly divided between a two story beachfront building and a convenient tower that gives a commanding view of the resort. The rooms are fully air-conditioned and come with TV (U.S. stations, via cable) and a fully stocked convenience bar (soda, alcoholic drinks and snacks). A spacious dining area and a lobby bar round out the amenities. Both the outdoor restaurant—La Chopa Loca for "crazy fish"—and the indoor Galleon serve good food that is a mixture of Mexican and gringo dishes. About the only shortcoming of La Ceiba is its prices; they seem to be too low for this type of full resort treatment! With the peso devalued, both La Ceiba and Cozumel offer a quality vacation at a bargain price.

When it's time to dive, usually around 9:00 am, it's just a short walk to the pier from your room. Carlos Sierra's Dive Cozumel services La Ceiba's guests and any one of four spacious 40 foot boats will pick you up. With tanks and weights already on board, loading is quick and you can sit back and enjoy the ride to the fabled reefs of Palancar. I dove with Carlos Mena, a 17 year veteran guide with extensive knowledge of Cozumel reefs. All his dives were conducted safely and as the week progresses, Carlos invites passengers to request the type of dive they'd like to do.


There's quite a bit of variety in Cozumel. If you want a shallow reef with a lot of fish and coral, head for Paradise. Actually, it's three different dives complete with handfed 50 pound grouper and both spotted and green eels. Carlos Mena and many of Sierra's dive guides not only feed these critters to the delight of divers and photographers alike, but they fed their parents and grandparents as well.

If you're looking for a little more excitement, you can always jump over the wall at more than 15 different sites. But, when the dive guides talk about the current, listen! The channel between the island and mainland acts as a funnel for clear, nutrient rich water. It is this current that helps make the southeast reefs of Palancar and Santa Rosa so prolific. Flying along the wall at two knots is a breathtaking experience, but stay with the guides and enjoy the dive. If it's your first dive after a long layoff, I'd suggest a shore warm-up or shallow dive first.

Between the shallow reefs and the drop-offs there are tons of interesting sites to visit. The wall dives are conducted with a maximum depth of 80 feet and the intermediate dives are in the 50 to 70 foot range. Again, big fish, massive coral formations and good visibility are usually the name of the game. Try Tormentos, Yucab or Cordona for this depth range. Chankanab is best for little or no current. Exercise a little extra caution even in mild currents: Grabbing onto a piece of coral or a seafan can damage it, so line up your photographs with the drift in mind.

After the first dive, the boats head to one of several beaches for a quick lunch break. Although there are small concessions available on the nearly deserted beaches, the chief dive guides prepare delicious fish and lobster lunches. Since several boats usually pull up to the beach, it's a great way to meet other divers to compare notes and start planning your night life. After lunch, it's back on the boats for another dive (usually a shallower one in the 50 foot range) and then back to La Ceiba. Make sure you see the Christ Statue, a sculpture set in 50 feet of water on a sandy bottom.

Once you're back at La Ceiba, you don't have to leave the hotel if you don't want to. However, in addition to its restaurants and bars, there's a brand new disco just a short walk away. Also, I recommend a trip into the little town of San Miguel so you get a chance to experience Cozumel's night life. This little island, with a population of just more than 35,000, has a variety of restaurants and discos to party in. Again, the peso makes for good bargains in food and drink. Although many prices are quoted in pesos, the dollar and all major credit cards are welcome everywhere.

The combination of Cozumel's diving and La Ceiba's full service hospitality make for a wonderful vacation. In a few years, I suspect the word will have spread far beyond Texas. If you like the idea of a professional dive resort mixed with the culture of the Mexican Yucatan, don't mind excellent visibility, massive coral reefs, big fish and just enough *mañana* to help you relax, you can contact La Ceiba by calling: (800) 446-2166; in Texas, (713) 446-2166. You can write: Two Worlds Travel, 1307 First Street, Humble, TX 77338. 



swimming pool and a large (10 x 21 foot) spa that's the best way I've found to rinse off saltwater. Being able to order drinks from the bartender while sitting in the spa isn't too shabby either. The outdoor restaurant completes the creature comforts outside the hotel. And, if you're still not ready to unwind in the spa, there is windsurfing just a short walk down the beach.

Inside, La Ceiba lives up to all its



Wenoka Mini Cabrilla

A Silicone Special For Small Faces

TEXT AND PHOTOGRAPHY BY BONNIE J. CARDONE

There is a bewildering assortment of masks available today. Choosing the right one for you can seem a formidable task. If, however, you decide you want a single lens, low volume silicone mask, with a pretty frame and easy to adjust straps, try the Wenoka Mini Cabrilla on for size.

A scaled down version of the Cabrilla, the Mini was especially designed for smaller faces. The skirt is crystal clear, surgical grade silicone. This material is soft and comfortable. It is also long lasting and will not cause allergic reactions. Because it is transparent, it lets a lot of light through. Your model will be more photogenic wearing a silicone mask. The Mini Cabrilla has a double edged skirt for a good seal.

The Mini Cabrilla's frame is a sturdy, heavy duty plastic. It comes in bright red, pink, blue and smoke. (Wenoka has matching Sea Style snorkels, too.) The silicone skirt is tinted, almost imperceptibly, to match the frame. There is a black neoprene rubber skirt with a yellow frame as well (\$32.50).

So far you may think the Mini Cabrilla resembles dozens of other masks you've read about on these pages. Well, think again. It and its big sister were designed to provide better downward vision. To achieve this, the lens has been canted back 11 degrees. To see this, you have to look at the masks from the side. When

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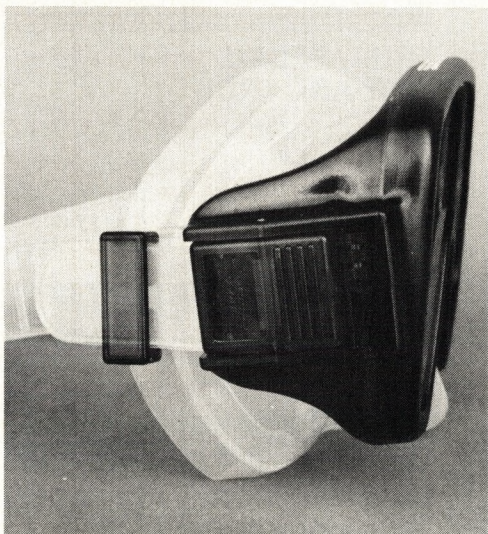
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800-663-8746

800-222-4552

OR CONTACT YOUR DIVE TRAVEL AGENT



The frame of the Mini Cabrilla is canted 11 degrees to provide better downward vision.



The Mini Cabrilla has a crystal clear silicone skirt and a unique head strap with a double row of oval holes. The strap can be adjusted easily even while being worn.

you do, you will notice the frame slants downward. It is closer to the face at the bottom than it is at the top.


The Cabrillas also have a unique head strap. Instead of being split at the back, it is very wide—two and one-half inches—with a double row of oval holes. This makes it a bit sturdier than split straps and it still holds the mask securely on your head. The straps are attached to the mask with Wenoka's easy to adjust strap

locks. Simply release the lock by pressing on its ridges, then pull on the strap to tighten or loosen it. The strap ends are held in place with clips that match the color of the frame.

The Mini Cabrilla is very low volume, making it simple to clear should there be any water leakage. It has a nose pocket for quick and easy ear equalization.

One of clear silicone's only disadvantages is that contact with black neoprene

rubber objects causes it to discolor. Wenoka has solved this problem by providing a carrying case with its masks. Made of see-through plastic tinted to match the mask frame, it has a thin layer of foam on the bottom. It keeps your mask from harm and from turning an ugly shade of brown.

The silicone rubber Mini Cabrilla sells for \$49.95. Check it out at your nearest Wenoka dealer. 



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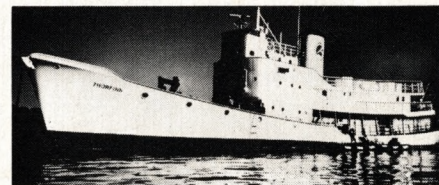
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TRUK/PALAU LIVE-ABOARDS

See & Sea Travel is offering two new ways to dive Truk/Palau on live-aboard dive boats. First, there is one week



aboard *Thorfinn* diving Truk Lagoon's wrecks and the Western Islands.

And, now these one week Truk live-aboard adventures can be combined with



five days aboard the all new *Sun Tamarin* in Palau.

These special combined adventures depart December 13, January 10, February 7 and May 2. For further information, contact See & Sea Travel, 50 Francisco St., Suite 205, San Francisco, CA 94133 or call (800) DIV-XPRT; in California (415) 434-3400. 🌿

SAIL/DIVE ST. CROIX

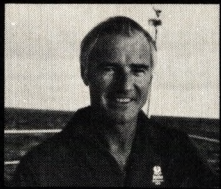
Dive Experience of St. Croix is offering a complete sail/dive package: A 42 foot Whitby cruising ketch sails the U.S. and British Virgin Islands, diving the wreck of the *Rhone* and other sites. Completely equipped for cruising, the vessel features a full galley with refrigerator/freezer, two heads, two showers and stereo. It sleeps six in three cabins.

Certification courses up to advanced open water are available during cruises. For more information contact: Dive Experience, P.O. Box 4254, Christiansted, St. Croix, USVI 00820. 🌿

PORTS OF CALL

Recently, at Seaspace in Houston, Texas the 112 foot dive vessel *Ports of Call* received an award as the best live-aboard dive vessel for 1985. The *Ports of Call* offers weekly live-aboard trips to Little Cayman, providing its guests unlimited diving on legendary Jackson Point, Bloody Bay Wall and other sites. The *Ports of Call* recently invested \$15,000 in the placement of nine mooring buoys around Little Cayman.

For charter information and individual bookings contact: Tropical Adventures Travel, 170 Denny Way, Seattle, WA 98109; or phone (206) 441-3483. 🌿



CARL ROESSLER REPORTS FOR SEE & SEA TRAVEL

President, See & Sea Travel Service, Inc.
Author, *The Underwater Wilderness*
Mastering Underwater Photography
The Undersea Predators
Diver's Guide to the Cayman Islands
Coral Kingdoms

PHILIPPINES ABOARD TRISTAR OR MAVERICK

Now and then a destination evolves services so as to fit every possible need. That happy situation now applies in the Philippines, and you can take advantage of it to achieve a superb diving vacation precisely designed to fit your personal needs.

For two years now, See & Sea Travel has offered groups high adventure aboard *Tristar*, 120 feet of air-conditioned comfort and service. With a crew of twenty to serve you, *Tristar* offers you the exotic Philippines' finest diving without sacrificing one iota of comfort or privacy.

See & Sea offers three departures aboard *Tristar*, one each in the prime months of March, April and May to guarantee you the best in weather, water clarity and reef life.

Well, you say, *that certainly seems to cover everything. How could you improve on that?*

Only one way.

What if your vacation is on some date other than *Tristar's* schedule? Or what if you want the ultimate privacy of a charter for 2-4 divers with a top-quality live-aboard cruiser all to yourselves?

Enter *Maverick* to fit every possible situation. This 42 foot private cruiser is available for unlimited dive cruises from December through May on some of the richest reefs in the archipelago. Now

you may schedule your dive vacation when you want to dive, for as few as two divers.

Maverick is forty-two feet in length, American owned and operated, and fully rigged for dive cruises. Want a Christmas cruise? Now it can be offered. Want a week-long cruise? Or ten days? Or two weeks? Want to combine a week in the Philippines with a week in Truk or a week in Palau? Now See & Sea can fit *your* schedule and your needs.

Large groups or small can achieve their own goals. For fifteen divers to enjoy hotel-like service, or for two divers to enjoy personally-catered diving, just call See & Sea.

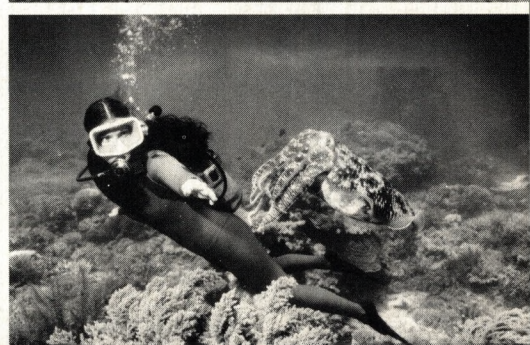
The increase in demand for live-aboard diving has exceeded all projections. *Skin Diver* magazine predicts that live-aboard vacations are the fastest-growing segment of the diving industry, and that nearly sixty percent of all divers will soon have taken a live-aboard dive cruise.

So if you are dreaming of diving the Cathedral, or the riches of Sombrero Island or the black frogfish of Culebra; if you yearn to dive the flanks of Tubbataha Reef or Jesse Breazly Reef; if you've heard that the Philippines has the richest and most prolific reef life in the world, call See & Sea now to reserve your trip on either *Maverick* or *Tristar*.

Once again the world leader in dive travel has come up with the right idea - offer the traveller what he or she really wants.

Now the best Philippine diving is yours from the opening of the best weather season in December to the beginning of the June monsoon.

Better make your plans now. Call See & Sea's hotline at 800-DIV-XPRT for information and brochures.



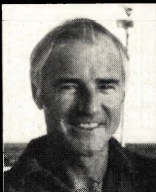
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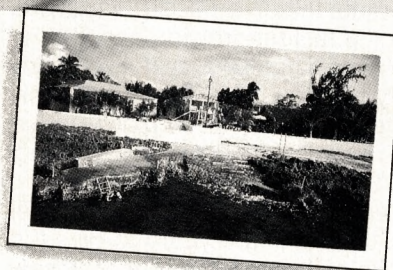
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ATLANTIS 1,000TH DIVE

The operators of the *Atlantis* submarine, the world's first 28 passenger submersible and a major attraction for visitors to Grand Cayman, recently held celebrations following the conclusion of its 1,000th dive. In the short time since *Atlantis* began operation in mid-December 1985, its schedule has expanded to include eight dives a day plus regularly scheduled night dives.

Achieving depths of 150 feet off Grand Cayman's famous wall, one of the main attractions is a spectacular view of the 200 foot inter-island freighter, *Carol Lee*, which sank in February of this year and now sits on the side of the wall in depths of 120 to 180 feet.

The *Atlantis* is one of two passenger submarines of this type. Built and designed by Sub Aquatics Development Corporation in Vancouver, B.C., her sister ship, *Atlantis II* was a major attraction at Expo 86.

The scheduled champagne toast became a cookies and punch celebration when the participants for dive number 1,000 turned out to be local Caymanian school children taking part in *Atlantis'* program of making sure every school child in the Cayman Islands sees the beauty of the U/W world that attracts so many visitors and divers.

BONAIRE SCUBA CENTER GUEST INSTRUCTORS

The Bonaire Scuba Center, at the 148 room Bonaire Beach Hotel, has put into operation a two month guest instructor program. The program, designed to give qualified scuba instructors hands-on experience with both the problems and the rewards of Caribbean island resort teaching, is geared mainly toward the multi-certified or specialty certified instructor wishing to expand his or her knowledge of the industry. Accommodations and a work permit on Bonaire are provided.

Al Catalfumo, the stateside partner in Bonaire Scuba Center, said he instituted the program in the late spring of '86 mainly as an experiment and has been more than pleased with the results. "Many instructors feel they might like to work in the Caribbean but are unwilling to break the ties with home and job to try something new in a foreign country. This two month program gives them the opportunity to settle into island living and to learn to deal with situations that may be different than those they encounter teaching stateside."

For more information and reservations, contact Al Catalfumo at the Bonaire Scuba Center, P.O. Box 775, Morgan, New Jersey 08879; telephone (800) 526-2370; in New Jersey (201) 566-8866.



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FISHEYE VIDEOS

Fisheye, Grand Cayman's photo and video specialist, is offering a new service for all dive groups visiting the island. It is now possible for a Fisheye video cameraman to accompany any group to record their U/W adventures.

An agreement has been reached with all of Cayman's major dive operators that allows this service to take place as part of a normal morning of diving. Tapes, complete with titles and music, are premiered the same evening at D.J.'s Cafe, a popular island nightspot, and are available for purchase.

Additionally, Fisheye offers classes in advanced underwater video. The five day classes, designed to teach the neophyte all he/she needs to know to produce his/her own video programs, emphasizes underwater work. Topics include titles, storyboards, lighting, editing and soundtracks. By the end of the course each student will have produced his/her own 30 minute video with titles and music.

For details on any of Fisheye's services contact them at P.O. Box 2123, Grand Cayman, BWI or call (809) 947-4209. 🐟

BADD

The National Captain's Institute has launched a campaign called Boaters Against Drinking and Drugs (BADD). The institute, a not-for-profit boating educational corporation, recognizes that such a campaign will require a massive effort. Captain Bob Arnold, president, said Coast Guard tests have shown that—with no alcohol of any kind—motion, vibration, engine noise, sun, wind and spray create enough fatigue to cause operators to suffer serious impairment in coordination and reaction time. Combining alcohol with this induced fatigue can be murderous and suicidal.

The Coast Guard estimates that as many as 50 percent of all boating accidents are alcohol related. On the other hand, statistics for alcohol related airplane crashes are low because of pilot awareness of the inherent danger of mixing alcohol and flying.

Arnold explained that the BADD campaign includes a similar educational awareness program against both alcohol and drug abuse by recreational boaters. He said that, although BADD has started nationwide mailings of informational articles, brochures and stickers, it will require funding to continue. Readers are asked to send contributions in any amount to BADD, National Captain's Institute, Inc., P.O. Box 13714, St. Petersburg, FL 33733. Those sending \$5 or more will receive an acknowledgement and a heavy duty vinyl BADD sticker. Amounts more than \$15 can be charged to Visa, MasterCard or American Express. Donations are fully tax deductible. 🐟

800 FT WALL DIVE



PHOTOS BY GERRI MURPHY

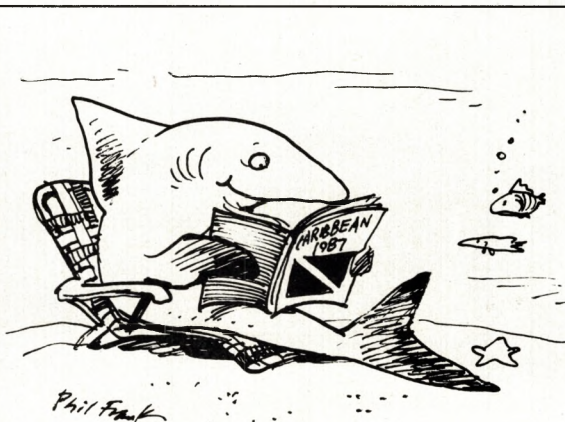
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Wing your way to Lizard Island on Air Queensland and discover 2,500 acres of national park set in a turquoise lagoon. It is the exclusive diver's hideaway with accommodations in secluded island-style luxury for only 64 guests. World-famous Cod Hole, Cormorant Pass, Hilda, Day, and Carter Reefs are just an hour away by fast,

specialized dive boat. All dive equipment is available for rent. Lessons and full certification are available. This magnificent resort also offers countless beaches, fresh water pool, tennis court, light and heavy game fishing, sightseeing by glass-bottom boat, plus much more. For complete information on fares and travel, call (213) 381-3062 or (212) 697-3694.

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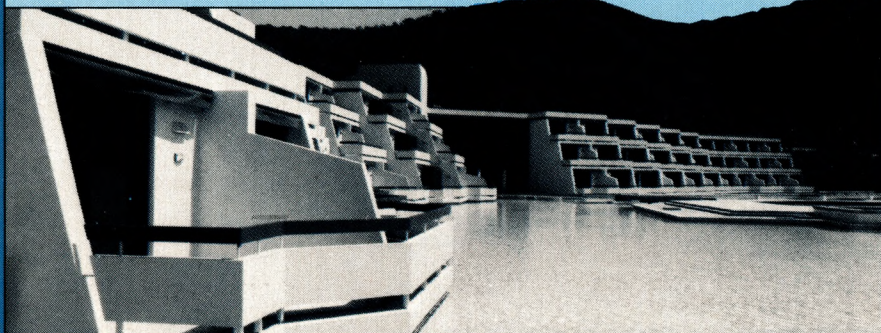


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How do you improve on paradise? That's what the world will discover in late 1986 when Hayman Island Resort reopens after a \$AUS120 million reconstruction program. This complete holiday island on the Great Barrier Reef will offer superb accommodations for the whole family: complete air-conditioning, 24-hour room

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service, 5 international class restaurants, water skiing, sailing, and nightly entertainment. A 25-knot dive boat offers fast daily access to Bait Reef and beyond. Hayman can be reached by Ansett Airlines jet to Hamilton Island, and transfer on the luxurious M. V. Sun Goddess. Call *Dive In Australia*, (415) 421-5588.



QUICKSILVER DAY TRIPS.

This high-speed catamaran out of Port Douglas provides the only day trip to the true outer reef for everyone – divers, swimmers, and even non-swimmers. Quicksilver offers two dives per day, learn-to-dive programs, sumptuous smorgasbord lunch, underwater observatory, and reef viewing tours in the unique Subsee Explorer. A wonderful way to enjoy great underwater sightseeing. Call *Dive In Australia*, (415) 421-5588.

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SCHEHERAZADE.

For an exceptional diving vacation, sail aboard Peter Wright's beautiful Scheherazade – a fully powered 55-foot sailing cutter. From Cairns, this exquisite yacht carries up to six passengers to the Ribbon Reefs, Cod Hole and Lizard Island with visits to Bougainville and Osprey Reef in the Coral Sea. To learn more, call *Dive In Australia*, (415) 421-5588.

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FITZROY ISLAND.

Only a 45-minute cruise from Cairns, Fitzroy Island is an unspoiled tropical jungle with huge volcanic rock formations. It is surrounded by coral reefs that create many superb diving areas. The resort offers a variety of accommodations and features a complete dive shop with resident instructors. Fitzroy is your chance to enjoy a virtually undiscovered paradise. For brochure, call (213) 381-3062.

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nder Down Under.

REEF EXPLORER CRUISES.

For one of the world's truly awesome underwater spectacles, explore the Great Barrier Reef and the Coral Sea with Australia's longest-established dive boat service. Discover virgin reefs, thousand-pound marlin, rays and turtles as you sail aboard the 12-passenger Reef Explorer or 10-passenger Auriga Bay. For larger groups, the company also operates the 112-foot, 20-passenger Challenger. You can enjoy day dive trips from Cairns to the Great Barrier Reef on the Down Under, a 41-foot, high-speed catamaran. All vessels are available for charter. And they all have sophisticated navigational aids such as a satellite navigator to pinpoint submerged reefs, autopilot, radar, and echo sounder. Barry May, a pioneer of Australian dive tourism, is an expert at finding superior diving sites. For more information about Reef Explorer Cruises and its wide variety of dive packages, call *Dive In Australia*, (415) 421-5588.

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Watersport specializes in regular, guaranteed departures to the legendary Yongala wreck and Great Barrier Reef. E-6 processing, diver propulsion vehicles, sailboards and PADI specialty courses available on board. This very large, stable,

air-conditioned dive vessel is owned by Australia's renowned diver training center, Mike Ball Watersports. Trips offer unlimited diving and exceptional value: 2 days \$150, 4 days \$445, 6 days \$595. Call *Dive In Australia*, (415) 421-5588.

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PORT DOUGLAS.

Located in tropical Port Douglas is Australia's northernmost fully professional diving facility serving the Great Barrier Reef. In a little over an hour, their 55-foot custom-built luxury dive boat will speed you at 25 knots to some of the best dive sites in the world. There you can enjoy stunning underwater scenery with the expert assistance of the boat's professional crew. The company also offers exciting land-based packages that include 4-wheel-drive Safaris through one of the world's last remaining virgin rain forests — a tropical adventure you will long remember. For more information, call *Sea Safaris*, (213) 546-2464.

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HERON ISLAND.

The only diving resort situated on the Great Barrier Reef, Heron Island offers access to some of the world's finest diving. Full dive facilities include four dive boats and over 60 rental scuba tanks. Only 26 minutes from Gladstone by helicopter, Heron is the home ground of tame moray eels, friendly manta rays, sea turtles (seasonal), and a huge variety of fish and coral. This colorful sea life makes it ideal for underwater photography. Lodging is available to fit most budgets and includes three meals and two dives per day, as well as tanks, weights and air. For information, call (714) 786-0119.

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Diving News From Down Under

Sail/Dive The Barrier Reef

TEXT AND PHOTOGRAPHY BY GERI MURPHY

There are many ways to explore and dive Australia's Great Barrier Reef, but one of the most pleasant is a leisurely sail/dive cruise aboard a semi-private yacht. This type of travel offers the advantages of small group participation, personalized service and no commercialism. You can sail and explore the Barrier Reef as if it belonged to you and the reefs were your diving preserve.

The *Scheherazade*, out of Cairns, is such a vessel. The owner/skipper Captain Peter Wright has 25 years of sailing and diving experience, exploring the waters of the Caribbean, Indian and Pacific Oceans. Based on his experience, he designed and built the ideal diving yacht, a 55 foot diesel powered cutter. She has a cruising range of 2,000 miles.

Scheherazade is manned by a crew of three and can carry a maximum of six, but many cruises run with only four or five people. The craft carries 14 tanks and two Bauer air compressors. There are two side boarding ladders designed specifically for divers. The craft also trails a 14 foot aluminum skiff with a 40 hp outboard. A 12 foot Zodiac inflatable is carried on board. The vessel will cruise at 9 knots under diesel power and can run up to 12 knots with the sails raised.

The interior of the *Scheherazade* is beautiful and offers all the comforts of home. The bunks are arranged in three separate cabin areas. There is one head and one shower. The dining area is cozy but comfortable. The vessel is equipped with a satellite navigator, radar, depth sounder, two way radio and radio telephone. She is wired for 12, 110 and 240 volt power and any type of strobe or dive light can be charged.

Captain Wright has spent the last ten years sailing, diving and exploring the Great Barrier Reef. His personal knowledge of the area assures accurate pinpointing of the very best dive sites. The *Scheherazade* operates two types of trips. One is a 10 day cruise into the Coral Sea and the other is a one week dive trip between Cairns and Lizard Island.

The one week Lizard Island trip departs from Cairns and cruises among the reefs and passes in the 130 mile stretch of the Great Barrier Reef between Cairns and



Lizard Island. Much of the diving is done among the Ribbon Reefs that offer some of the best diving along the outer edge of the Great Barrier Reef. For example, Captain Wright might visit Ribbon #5, which is marked by an ocean blowhole. Diving is done along the vertical face of a drop-off that begins at two feet and descends to 130. Underwater visibility ranges from 80 to 100 feet. At the north end of Ribbon #7, there is an excellent drift dive with a number of coral caves on a wall that ranges from 2 to 150 feet deep. At Ribbon #9 there is another spectacular drift dive along the vertical wall. The climax of the trip is usually a visit to the Cod Hole, where dive guests encounter 10 to 14 giant potato cod (groupers) that are as friendly as dairy cows. These 75 to 140 pound fish can be handled, stroked, patted and photographed without difficulty. Other residents of the Cod Hole include several giant moray



The *Scheherazade* makes ten day trips to the Coral Sea or one week cruises exploring 130 miles of Great Barrier Reef between Cairns and Lizard Island.

eels and an occasional pelagic fish. The cruise ends at Lizard Island, where Air Queensland flies guests to Cairns.

The cruise into the Coral Sea consists of a ten day/nine night sojourn. This itinerary includes a number of the best dives in the Ribbon Reefs and the Cod Hole but the main feature is a cruise out into the Coral Sea. *Scheherazade* stops at both Osprey and Bougainville Reefs, two large coral atolls. At Osprey the vessel stops at Southern Wall, a vertical drop-off ranging from 2 to 250 feet deep. The next stop is North Horn, a 60 foot deep reef that offers shark feeding opportunities and spectacular action pictures.

At Bougainville Reef *Scheherazade* visits Northwest Caverns, an impressive coral formation in 60 feet of water. One of the best dives is Vertical Wall, which is a beautiful drop-off ranging from 60 to 150 feet deep. Visibility in the Coral Sea averages 200 feet and can sometimes reach an incredible 300 feet. Marine life is large and abundant and includes great schools of barracuda, tuna and other pelagics. Manta rays are frequently seen and giant, ten foot tall soft corals are common.

For more information about *Scheherazade* and reservations, contact Dive In Australia, 50 Francisco St., Suite #205, San Francisco, CA 94133 or telephone (415) 421-5588. 🐠



SEA GIFTS

Seafood Processors' Discards Make Unique Gifts

BY HILLARY HAUSER

Mike Swinburne, age two and one-half, looked through the jaws of a mako shark and cautiously felt one of the sharp teeth that rimmed his little face. In the other hand, he held a chestnut cowrie, a brown and cream beauty that had come from local waters. He was about to head for a basketful of dried starfish when his father, Michael Swinburne, put him back into his baby carriage. Little Mike and his family, visitors to California from New Zealand, were taking in the wonders of a shell shop.

Many are finding out about the uniqueness of gifts from the sea. A mako jaw, for example, can be bought for about \$70 depending on its quality. This is not an unreasonable price for those who like rare reactions from the people to whom they give presents.

Or, how about giving your loved one the preserved beak of a sawfish? This thin, flat item is like a fat yardstick with a series of triangular projections along each side. For all this uniqueness, you pay about \$10.

This sculpture supports three sea urchin tests. Illuminated from the inside, these tests make attractive lamps. Such marine artifacts make excellent souvenirs and gifts.

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SEA GIFTS

Or, you might settle on a manzanita lamp with three sea urchin lights (\$125), a single urchin nightlight (\$20) or a dried starfish for less than \$1. There are also clocks made out of sanddollars (\$20), individual shark teeth (\$4.50), limpet pill boxes (\$8.95), strawberry *Strombus* rings (\$1), rough coral beads (\$6.95), or baby abalone earrings (\$2.50 a pair).

California waters do not yield traditional marine gems considered precious, such as pearls and corals. Pearls come from oysters, not found naturally offshore, and the coral that grows on the deep reefs around the Channel Islands is too porous to be made into jewelry. How-



A young boy examines the sharpness of the teeth in jaws from a large shark.

ever, a survey of sea oriented stores in any California city reveals a brand of salt-water goodies equally unique.

There is the beautiful chestnut cowrie, various murexes and ringed top shells, each of which sports its own unique natural design. Perfect abalone shells—green, pink and white species—might be discards from local seafood processors, except shell shops buy them by the bagfuls. Abalone shells are sold for an average of \$3-9 each in Santa Barbara stores, depending on the size and quality of the shell. Really good specimens command higher prices. Sometimes you can find a shop that has decorative clumps of purple or red hydrocoral brought up by divers from offshore reefs.

"There's so much to learn in this business," said Phyllis Marshall, who, with her husband Bob, owns and manages three Nature's Own stores in Southern California. Bob said he is taking a city college course and Phyllis said she is thinking of joining a malacological (shell) society, because she wants to learn more about the things she sells. Most people coming into their stores are interested in marine shells, she said.

During her walks on the beach, another shell shop owner, Betty Migneron, picks up many of the sea things that go into the ornaments she sells in her Summerland store, Tidepool Reflections. The driftwood, rocks, dried seaweed and shells she finds are fashioned into decorative items that sell for \$3-5. Like the Mar-

shells, Migneron buys her starfish, shells and other marine items from commercial outlets in Los Angeles.

Many marine species, especially those found in tidepools, are protected by state fish and game laws and collectors must have permits to harvest most types of marine animals.

Many sea lovers dislike seeing marine creatures trivialized by being made into clocks, paintings or ornaments. And, harvesting a marine animal just for its shell is like shooting an elephant for its tusks, they say.


"Whether you eat the animal or take it for its shell, it still ends up dead," said Shane Anderson, a marine collector for the biological sciences department at the University of California, Santa Barbara. Anderson advocates a reasonable approach to collecting. He said the red and purple hydrocorals that grow around the Channel Islands take 20 years to reach one foot in height.

Corals are actually colonies of very slow growing animals, a fact that surprises a lot of people who think of coral as some kind of plant. (Corals are often referred to as trees, which doesn't help clarify matters.) The tree part of the coral, which is used in the jewelry making process, is actually the skeletal home of millions of tiny animal polyps. These animals extend their feathery feelers to feed on the plankton in the currents of the ocean and each animal secretes a lime-like substance around itself that is similar to human bones. Since California corals are too porous to be used in jewelry making, they are sold locally in clumps—about \$20 for the small ones and \$50 for the larger sizes.

Shells are jewels themselves. They are the protective homes of soft mollusks, snail-like animals that extract calcium from the seawater to produce their hard, calcium carbonate encasements. Many of the shells sold in local shops come from tropical waters, mainly the Philippines. Of these, the chambered nautilus is a favorite, because of the delicate whorled chambers.

Many shops put a little light inside the shells, illuminating intricate patterns not visible otherwise. An interesting transformation created by internal lighting is effected on abandoned sea urchin shells, particularly the local variety that may look plain and lumpy to the average eye. With a small light inside the sea urchin test, a purple-pink glow illuminates an intricate floral pattern created by the animal.

The colors and patterns of marine shells are decorative and so varied it is hard to imagine nature displaying any greater originality than what appears in each of them, no matter how plain or discarded they seem.

Betty Migneron walked over to a basketful of mussel shells in the corner of her shop. "I pick these up off the beach to give to people," she said. "I love shells, just as they are." 

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Special dive and play packages, featuring underwater instruction, are being offered at the Genting Lucayan Beach Resort & Casino on Grand Bahama Island. The four day/three night and eight day/seven night packages combine accommodations and casino excitement with the expertise and training facilities of the Underwater Explorers Society (UNEXSO), right at the resort.

The packages include two boat dives daily (excluding arrival and departure days); tanks, backpacks and weightbelts; one night dive; one-half hour free use of the hotel's floats and boats; accommodations; welcome cocktail; casino chip; and admission to Pizazz—the hotel's Las Vegas-style revue; plus a souvenir photo and a beach bag. In addition, there are special beverage bonuses.

In addition to the dive instruction, the Lucayan Beach also provides a full range of watersports including swimming, sailing, parasailing, windsurfing and snorkeling. Additionally, the hotel has four tennis courts (all lighted for night play). Five PGA championship 18 hole golf courses are just minutes from the complex. Three restaurants are available.

For further information and reservations, contact Genting Lucayan Beach Resort & Casino, Dept. MS, Lucaya, Grand Bahama, The Bahamas or call (800) 331-2538. You can also contact 1610 SE 10th Terrace, Fort Lauderdale, FL 33316; (305) 463-7809. Or, call Bahamas Reservation Service at (800) 327-0787. ✕

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Aqua Adventures, the sports tour operator, is offering a new series of scuba vacation packages at 62 resorts in the Bahamas and the Caribbean through December 15.

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For information and reservations contact Aqua Adventures, Inc., 318 Lexington Avenue, New York, NY 10016; telephone (212) 686-6210. ✕

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A STEVE LUCAS PHOTOGRAPH

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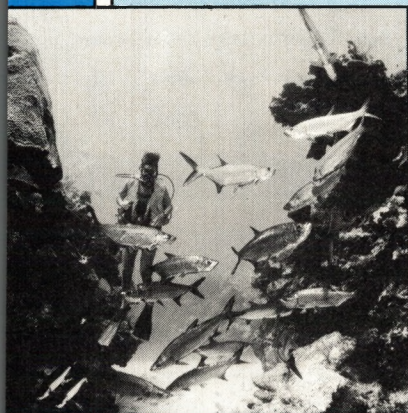
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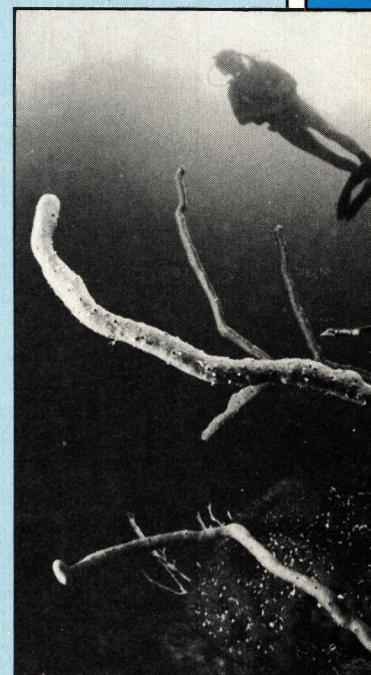
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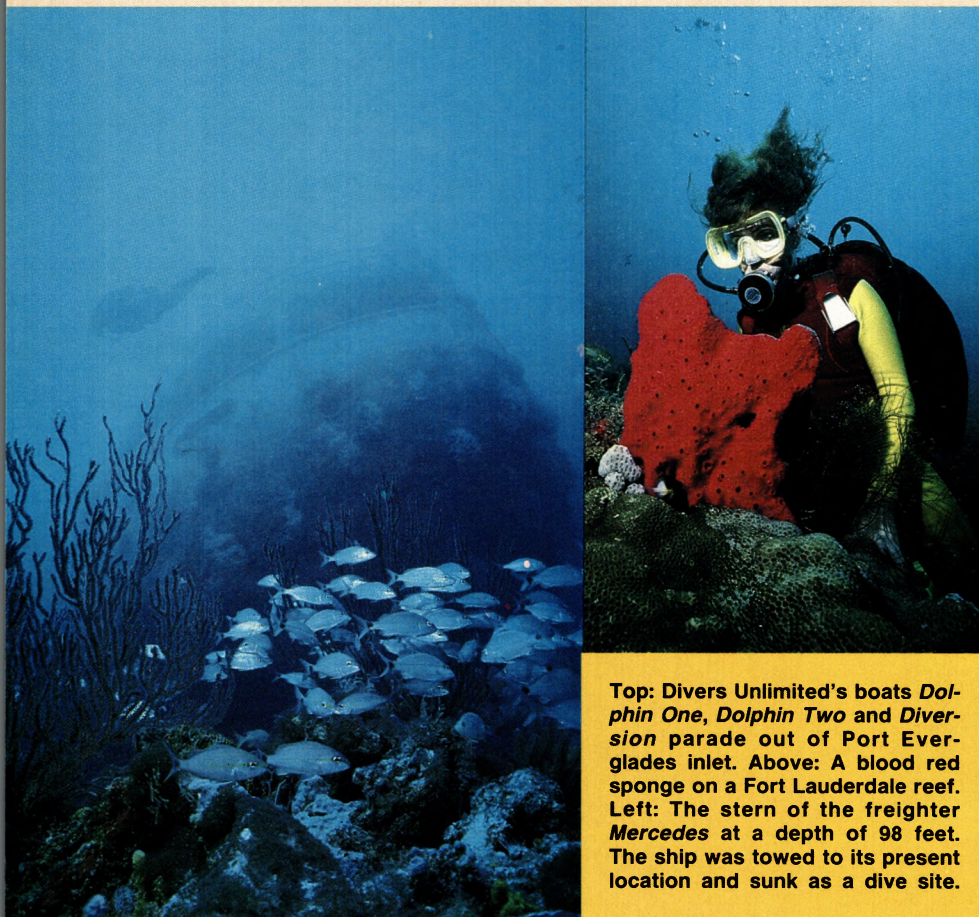
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DIVERS UNLIMITED



Top: Divers Unlimited's boats *Dolphin One*, *Dolphin Two* and *Diversion* parade out of Port Everglades inlet. **Above:** A blood red sponge on a Fort Lauderdale reef. **Left:** The stern of the freighter *Mercedes* at a depth of 98 feet. The ship was towed to its present location and sunk as a dive site.

Every time Dave Inman's Divers Unlimited boats head out of Port Everglades inlet it looks like a parade. On weekends the *Dolphin One*, *Dolphin Two* and *Diversion* are filled with joking, laughing divers—or nearly divers—on their way to the more than 50 good dive sites off Fort Lauderdale. Diving near the coast of one of Florida's most fun loving cities, they already know they're going to have a good time. They're on their way to some of Florida's easiest and best diving: Wrecks, coral reefs, drift diving, lobstering, underwater photography and a lot more lie just outside the inlet.

At places along the coast the reefs are close and shallow enough so your non-diving companions can snorkel while you scuba. Adjacent to the Port Everglades inlet, Barracuda Reef is near enough to the surface that you can easily get more than an hour from a single tank while friends watch from just overhead. A few hundred yards farther to sea, Hammerhead Reef has large growths of purple and blood red gorgonians and, when the current is running, it is one of the more popular spots for drift diving.

When the *Dolphins* and *Diversion* head north, the three reef lines they follow are almost continuous. Divers Unlimited's captains know dozens of the best spots along these shallow, mid-range and deep reefs. At some the coral mounds jump ten feet and more off the sand and offer



One Of South Florida's Largest Scuba Training Centers

TEXT AND PHOTOGRAPHY
BY STEVE LUCAS

hiding places for lots of photogenic, colorful and tasty marine creatures.

And, of course there are the wrecks. The now famous old freighter *Mercedes*, which sat in Molly Wilmot's Palm Beach backyard for several months after being grounded in a 1984 Thanksgiving storm, is here. You heard about it on the nightly news week after week until finally it was pulled from the beach, tugged to Fort Lauderdale and sunk. Now, it and the freighter *Rebel* are two of the main reasons divers want to come to this coast to dive. In often clear water, they offer really fun places to explore.

Operating the world's largest single outlet retail dive facility in nearby Hollywood, Inman is rightfully proud of his Lauderdale facility. At the Lauderdale Surf/Days Inn Hotel, divers are just a few steps from the world famous Fort Lauderdale beaches. Known from classic movies such as *Where the Boys Are*, they are wide strands of golden sand that make a perfect place for the nondiving members of your family to spend their days while you're out exploring the reefs. The three DUI boats are docked on the protected Intracoastal Waterway just across the street and behind the hotel. Divers with heavy gear don't have to lug it, but can have it ferried across to the boat on the dive shop truck.

His Hollywood store is the only operation in the United States to be honored—

not once but three times—with the PADI #1 diver training facility award. Inman's philosophy of making diving more fun is built around giving you more reasons to want to dive. How? Through upgraded and advanced training. In almost any week of the year you can vacation in the Florida sun and go away a better diver.

On many weekends while diving on one of the reefs I have observed a group of students learning how to enjoy the sport through activities such as lobster collecting. Before ever getting into the water divers are taught in the classroom how to recognize the difference in the three lobster species that live on Fort Lauderdale's reefs. They learn all the rules and laws that govern their protection and conservation. With slides, charts and other aids the instructor makes sure no one will endanger the longevity of Florida's tasty treat.

On other weekends, groups of divers earn their advanced open water rating. Compass courses are plotted and the instructor gives each a particular navigational assignment that will later prove to be one of the most valuable skills a diver can possess. In addition, divers are taught basic emergency assistance, lost object recovery and a lot of other skills.

In fact, you can learn almost anything you want about diving while having your vacation fun on lively, near to shore coral reefs. DUI regularly offers specialty certi-

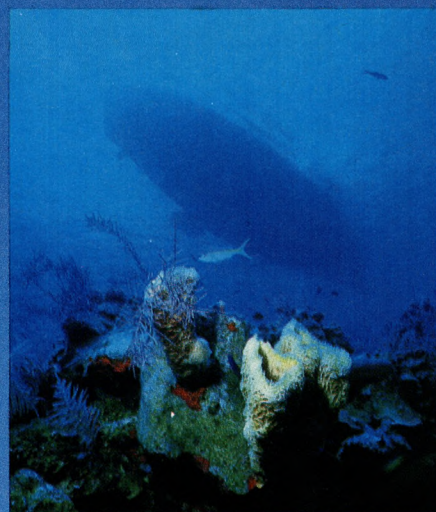
fication classes in deep, wreck, night and current diving, as well as ecology, underwater photography, rescue diving and others. With a little planning and timing you could earn as many as five PADI specialty ratings in only one week.

If you really want to get to the top, Divers Unlimited can take you all the way to your instructor rating. DUI is the only officially licensed Florida vocational diver instructor training school in the state. They are also the most experienced, having trained more instructors than anyone else in Florida.

Just coming to Fort Lauderdale to dive may give you the bug. While you are out on the wreck of the *Mercedes* or any of the reefs, it is not at all uncommon to have a boat load of instructors and their instructor candidates along. While you're having fun exploring the wreck or reef, they'll be having fun learning the valuable skills that will earn them the ability to make the fun of diving the source of their livelihood.

And, to make all this even more fun, Divers Unlimited and the Lauderdale Surf Hotel have put together some of the most attractive dive vacation packages in Florida. To get all the right answers on the fun diving in Fort Lauderdale, advanced diver training and packages call the Divers Unlimited travel desk at (305) 981-0156 or write: Divers Unlimited, 6023 Hollywood Blvd., Hollywood, FL 33024. 🐠

Above left: The interior of the DUI Hollywood retail center. It is the world's largest single outlet dive retail store. Dave Inman operates another dive store in Fort Lauderdale at the Lauderdale Surf/Days Inn Hotel—just a few steps from the beach. Above right: Fresh pineapple is served on every dive trip. Left: Fish feeding on the aft deck of the *Mercedes*.



LA STREGA

Cruising The Outer Limits
Of Belize Adventure

TEXT AND PHOTOGRAPHY
BY STEVE LUCAS

Dawn: *La Strega's* anchor is snagged just behind the coral ledge that divides the ocean we know from the depths where dolphins roam. A blazing ball, first orange, then yellow, is rising. Its rays skip off the water, creating sparkling flecks of silver. Then, as the ball gains altitude, the rays plunge into the shallows to paint a surreal peacock's tail of azure, turquoise, teal and aquamarine. Light reflects from the sand 40 feet below us and returns to the surface saturated with hues. It refracts into 100 dozen light sabers that dance toward the depths to reveal 1,000 shades of sapphire, then indigo, then cobalt.

To the north of our anchorage a small, flat island decorates the

Above: *La Strega* reaches remote dive sites such as Half Moon Caye, Lighthouse Reef and the Belize Blue Hole. **Insets:** A slipper lobster on brain coral at Turneffe Island; vase sponges at Half Moon Caye Wall. **Right:** A toadfish at Turneffe Island.



horizon. Jet black frigate birds soar overhead. Half Moon Caye has the only rookery of pink footed boobies in this part of the Caribbean. With the rookery at its southernmost tip and a lighthouse at its northernmost, the only human inhabitants are the lighthouse keeper and his family. His wife keeps a guest register of everyone who visits their outpost. By custom, we leave our marks and the cities from which we came in her simple, hardbound notebook. On its pages are the names of the dozen visitors who have walked beneath these coconut palms in the past few days. One set stands out: "Melissa and Harrison Ford, Los Angeles, California." On a brief holiday, he is filming an adventure movie near here called *Mosquito Coast*. They are anchored only a



Hugh Parkey, captain of *La Strega*.

few hundred yards from *La Strega*.

Strange: Only this morning by some unplanned stroke of fate, someone inserted a tape in the yacht's stereo. The horns and tympanies of long, long ago, in a distant galaxy far, far away stirred us to laughter. The theme from *Star Wars* echoed toward "Han Solo's" craft. I wondered if he heard. Probably not. Ford was here for the same reasons we were: solitude, peace, quiet and diving.

Mainland Belize, 50 miles away, has practically no tourist industry save the few fishing and diving lodges scattered throughout these islands; those and a handful of live-aboard dive vessels. It's not the end of the earth but, as they say, you can see it from here.

Lost in the western Caribbean, bordering Mexico, the underwater breezes gently wash Belize's reefs. Belize has the longest barrier reef in the Caribbean and some will tell you it is second in size only to the living barrier that protects Australia.

In the reef's slow moving current majestic eagle rays sometimes fly in pairs

and 100 year old, barnacle laden turtles lazily swim by your side. Stoplight parrotfish flash their signals at every corner in the reef. Bar jacks hover above southern stingrays in some strange commensal relationship. Eighty pound black grouper stare at you from a safe distance and a lonesome shark sometimes breaks the surface with its dorsal fin.

Beneath the massive structures that have built themselves along Lighthouse Reef's edge of the world, wide tunnels are bored deep into the coral. Some are filled with a flowing mass of liquid silver-blue: Countless minnows scatter with every exhaled breath from our regulators, then regroup only to flee again with the next. In the recesses of the cavern, giant eyes reflect the glow of our lights: A five foot tarpon is lurking among the swirling mass. Head-on he is well camouflaged, but sideways his scales shimmer, making it impossible for him to hide.

The schooling fish most of us have become accustomed to seeing in other parts of this sea are noticeably absent. So are many of the tiny marine organisms that are common on reefs only a few hundred miles away. We can't find a single anemone. "Seasonal," Hugh Parkey tells us, shaking his head with some degree of self-surprise as he exits the water from his first morning dive. "Big schools of jacks, surgeons, snappers and grunts are normally swimming down there!" A bearded, burly, always laughing lover of the ocean, Parkey, "Captain Ho Ho," has only recently escaped Southern California to this Caribbean nation. Now in charge of *La Strega*, he is at once master of ceremonies, divemaster, camera assistant, bartender and friend.

Instead of looking at the reef from strictly a close-up perspective, he tells us to swim away from the wall to fully appreciate its grandeur. From 30 feet out we see with his vision. What appears to be hundreds of red-brown rotund objects cling to the wall: barrel sponges. Some are belching a puffy white smoke, their method of propagation. Among them, three and four foot skinny fingers of blood red sponge sway in the rush created when a diver's fins venture too close. And, colonies of blue shadowed pink vases hang precariously over the deep, scooping nutrients from the current.

Between the coral mounds, sand channels from one to 20 yards wide run toward the precipice, then spill into the ink. Pairs of gray angels work their way back and forth through the subaquatic pathways, stopping briefly at every third outcropping to snatch a coral polyp. Blue-green scrawled filefish swim without any visible means of locomotion across the face of the corals. Jewel crowned queen angels peek shyly from beneath the overhangs of cascading plate corals and toadfish skulk beneath the ledges.

At night, some of the fish, crustaceans

and invertebrates we can't find during the day sneak out of their hiding places. Slipper and spiny lobster scurry across the corals. Entire schools of squirrelfish swim over the sand. Brittlestars all but cover the orange sponges. Three-eighths inch red hermit crabs feed on translucent green algae. Flame scallops extend their feathery white tentacles from fire-red mantles. And, colonies of featherduster worms wave in the ocean currents like pale pink tulips.


Well north of Lighthouse Reef, *La Strega* often works its way deep into the corals. Relatively few have made this journey. The water must be calm and the sun bright: The pathway is filled with turns and treachery. At the end of the journey the bottom drops away in an ever widening bell: This is the Blue Hole of Belize, made famous by the exploits of Cousteau and *Calypso*.

Almost perfectly round at the top, completely encircled by shallow corals, the enormous hole grows larger and larger as it deepens. When divers' bubbles cascade upward, at 90 feet and deeper they ricochet off long stalactites that hang from the slanted ceiling. And, out in the center, an enormous hammerhead is rumored to cruise.

At 86 feet in overall length, the steel hulled *La Strega*, the witch, is one of the few vessels that range as far as the Blue Hole and the entirety of the best diving waters near Belize. There are double and quadruple cabins, each outfitted with a private head. Up to 14 divers can set out on one of three separate itineraries. Each is arranged so those who fall in love with this part of the ocean may visit it repeatedly and still explore new sites.

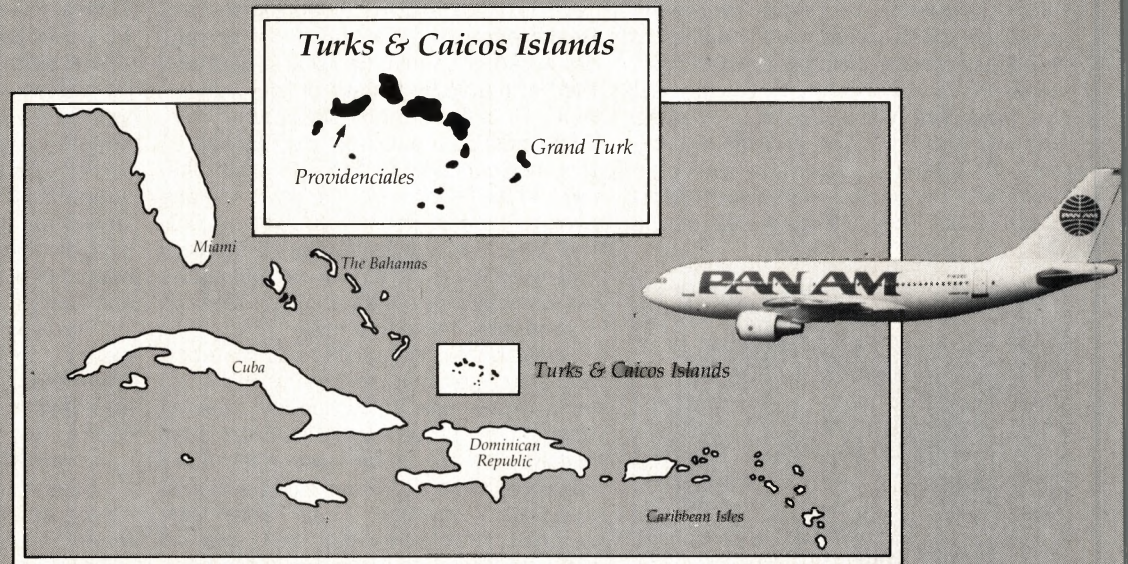
Hugh Parkey and his *La Strega* crew must have a magical charm for making lasting friendships. Maybe there is some brew or potion long time cook Thelma (Lou) places in the conch chowder or dinner wine. If so, it must flow over into the ocean. On the way to Turneffe Island a pod of five spotted dolphins came to our friendly witch to catch a free ride on the bow wake. Not for just a few minutes, but for nearly an hour they rolled and tumbled, twirled and leaped. Only after the anchor was firmly planted did they decide it was time to seek new playmates.

Even in Belize City Hugh's friends quickly become ours: Cutie, the baby howler monkey, came aboard to roam freely in and out the windows of the oversized saloon; Elvis, the wood carver who creates lifelike barracuda, mantas, sharks and dolphins from the wood of the zericote tree; and Luke the sixth grade shoeshine boy who works the airport.

Charters aboard the *La Strega* can be arranged by calling Poseidon Ventures Dive Tours, (800) 854-9334. In Texas call (713) 820-DIVE. You can write to 359 San Miguel Drive, Newport Beach, CA 92660. 

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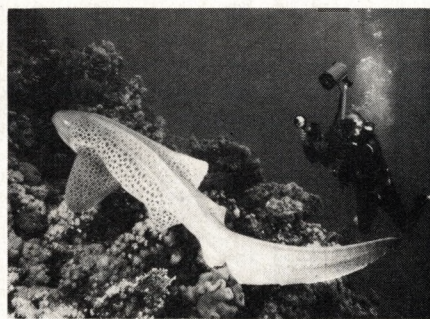
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April-June: The north coast of the main island will be visited, including Madang and the islands of Hermit and Manus in the Bismarck Sea. Hansa Bay, where there are more than 34 WW II Japanese wrecks, will also be visited.

July-September: The vessel will cruise between Kimbe and Rabaul on the north coast of western New Britain. Rabaul rivals Truk Lagoon for the title of wreck diving capital of the world.

October-December: The boat will cruise from Milne Bay on the southeast corner of the main island, diving the Trobriand Islands, and the Louisiade Archipelago in the Coral Sea.

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For further information, contact La Mer Diving Seafari, Inc., 823 United Nations Plaza, New York, NY 10017 or call (800) DIVE-NOW or (212) 599-0886. 

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Ed and Kathi Casper have joined the staff of Treasure Cay Divers on Treasure

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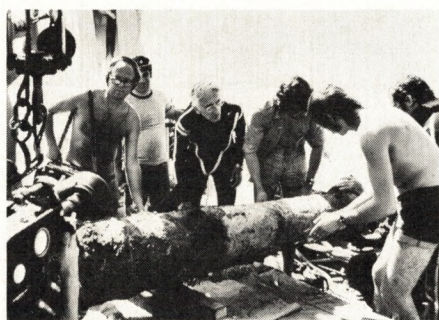
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
COUSTEAU ODYSSEY VIDEO

Ten select episodes of the Cousteau Odyssey are now available on VHS video tape from Warner Home Video. Each episode is recommended for viewing by the National Educational Association. The ten episodes are: Blind Prophets of Easter Island, *Calypso's* Search for the *Britannic*,




Calypso's Search for the *Atlantis*, Cliperton: The Island Time Forgot, Diving for Roman Plunder, Lost Relics of the Sea, Mediterranean: Cradle or Coffin?, The Nile, Time Bomb at 50 Fathoms, The Warm-Blooded Sea: Mammals of the Deep. For more information contact Warner Home Video, 4000 Warner Boulevard, Burbank, CA 91522; (818) 954-6000. 

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Continental Airlines is offering a special air fare to Cozumel through December 15 (several blackout dates apply). Called the Cozumel Diver Holiday, it allows two to fly, midweek round trip, for the price of one and one-half. There are special discounts available on the weekends, too. For information on the Cozumel Diver Holiday contact Continental Airlines at (800) 525-0280 or your travel agent. 

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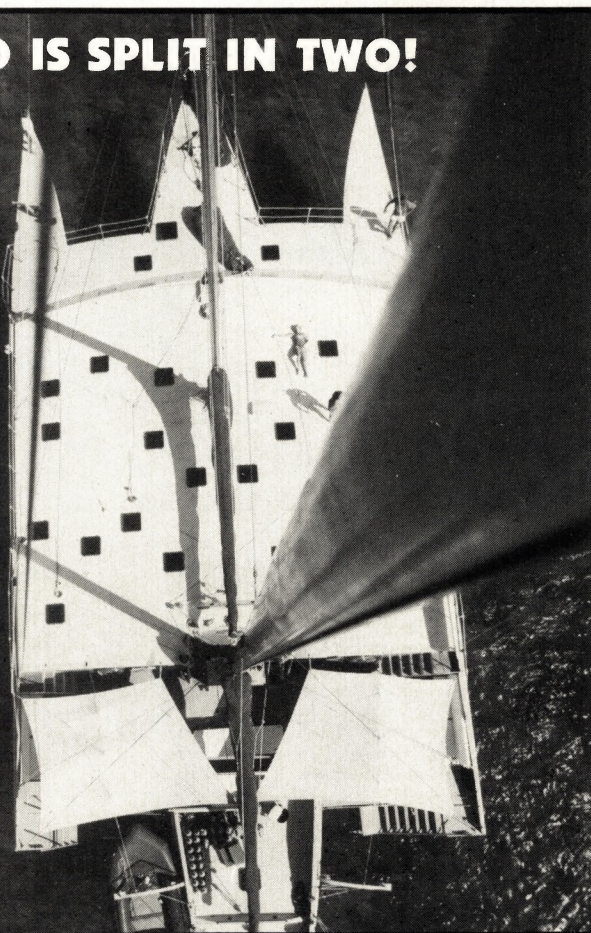
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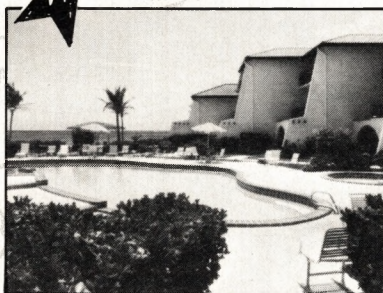


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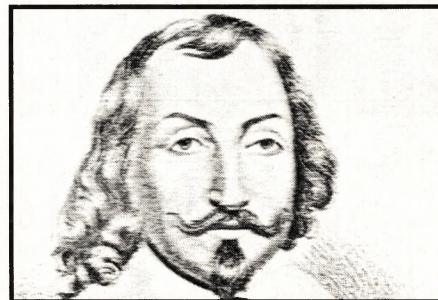
SUNKEN TREASURE

Lake Champlain Tempts
The Adventurous For A
Trip Into The Past

BY HOWARD M. DUFFY

In 1609, when Samuel de Champlain discovered the lake now bearing his name, little did he realize this 107 mile long body of water would be the scene of naval battles in three wars. Neither could the French explorer know that strange looking people in wetsuits and diving masks would be plunging below the lake's surface, nearly four centuries later, in search of lost treasures and artifacts that spin the tale of the lake's history.

Forming the boundary between the states of New York and Vermont, Lake Champlain offers adventure to the diver who wishes to plunge into history. For in-



French explorer Samuel de Champlain

stance, during the War of 1812 a British paychest, containing gold coins, was lost off Cumberland Head. It occurred during the last naval engagement between ships of the United States and Great Britain. In that battle, won by the Americans, the British ship *Confidence* (*Confiance*) was disabled. As Yankee seamen advanced to board her, a small boat left the side of the crippled vessel, carrying the paymaster's chest of gold coins. The Americans gave chase, but before they could overtake the enemy, violent waves sent their quarry crashing on a rocky reef. The paymaster's chest descended into the lake.

Although many attempts have been made to recover this chest of gold coins, none has been successful. Old-timers in the Cumberland Head area believe wave action has since smashed the wooden chest to bits, for ancient British sovereigns have been discovered occasionally in the sand and silt of the lake's bottom at this point.

A more modern treasure of some \$45,000 in silver coins lies near Colchester Point on the Vermont side of Lake Champlain. Well out from the point's rocky beak the schooner *General Gates* crashed on a reef during a storm, send-

ing a small fortune in silver coins to Davy Jones' locker. Allegedly the coins are still there, but few details are available.

In the same general area where the paychest from the *Confidence* was lost, a schooner, the *Trumbull*, was the source of another treasure. When this vessel went to the bottom, she carried \$56,000 in coins with her. Fishermen have reported seeing some of these coins scattered on St. Michael's Reef.

Divers have long sought the wreckage of a French fleet that sank in a storm on October 14, 1759 in about five fathoms of water somewhere north of Plattsburgh, off the west shore of Champlain. The exact location in which these ships went to the bottom has never been determined. However, they sank with all their armament on board.

Another French disaster has drawn divers to the vicinity of tiny Garden Island in recent years. During the French occupation of the area more than two centuries ago, a bateau laden with Louis d'or, or golden Louis, sank near this island. The money was a payroll for the garrison at Fort Ticonderoga, then called Carillon. There is no report of the gold's ever having been found.

North of Garden Island is another site made famous in history—the Battle of Valcour Island. On October 11, 1776 the British and Americans engaged in the first naval battle of the Revolutionary War. Surprisingly, the Yankee fleet was commanded by General Benedict Arnold. Although greatly outmanned, the Americans kept their foes busy from 11:00 am until 5:00 pm.

Later that night the battered Yankee fleet sailed southward under the cover of fog. Following Champlain's western shoreline, Arnold stopped at Schuyler's Island to make a few repairs on his badly shattered vessels and the next day the retreat continued. When the faster British ships again came into firing range, Arnold ran his ships ashore and set them afire at a cove now known as Arnold's Bay on the Vermont shore.

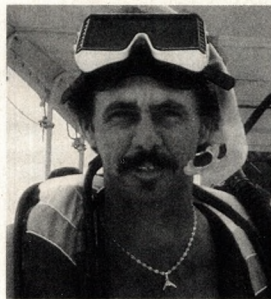
In 1938, a diver, Paul Bilhuber, found one of the cannons that Arnold threw overboard before beaching his boats. He later made a carriage for it and placed it at the entrance to Basin Harbor. More of Arnold's cannons await recovery.

The War of 1812 saw another naval engagement between fleets of American and British ships. This time the Yankees under Lieutenant (Master Commandant) Thomas Macdonough soundly trounced the British fleet commanded by Captain George Downie. In the battle, which took place in Plattsburgh Bay, Downie was killed and some of his ships were sunk. Others were captured and a few small boats escaped to Canada. The captured vessels sailed southward to Whitehall where they were dismasted and stripped of cannon. Over the years they were allowed to deteriorate and sink.

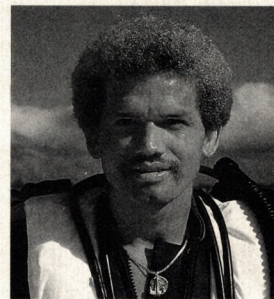
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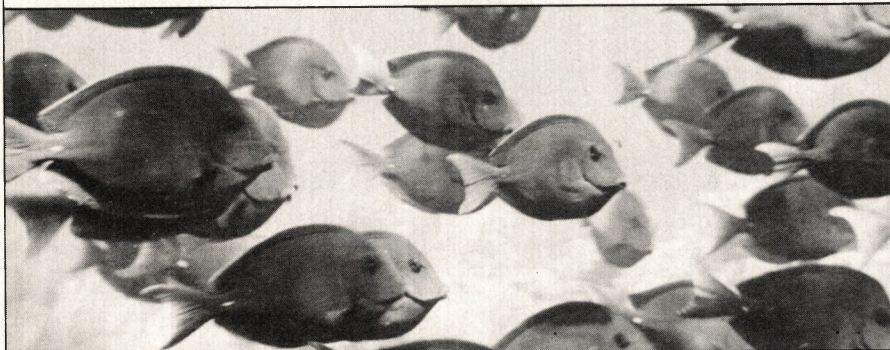
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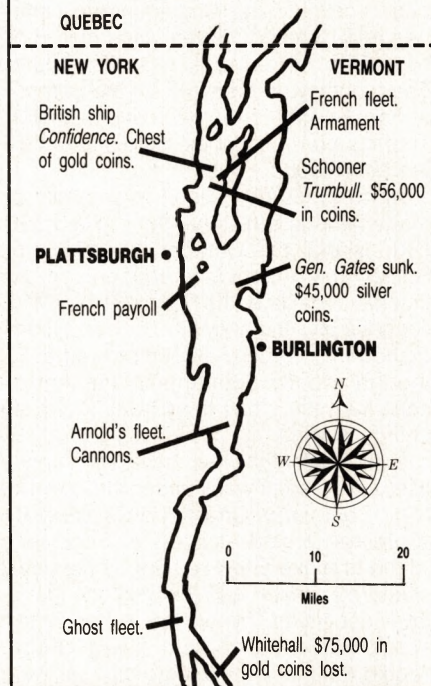
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CHAMPLAIN WRECKS

ships was sparked during the summer of 1982 when divers from the Champlain Maritime Society, under the leadership of Art Cohn, discovered more than 20 submerged boats at the southern tip of the lake, near Whitehall. Included were canalboats, barges and commercial craft—but the interesting finds were the British ships captured by Macdonough.

Water in the Whitehall area is generally murky, so divers James Kennard and Scott Hill used sonar equipment to pinpoint the sunken fleet. Kennard, an electronics engineer, built his own sonar. The gunboats surveyed were tentatively identified as the *Eagle*, a 20 gun American

LAKE CHAMPLAIN'S MYSTERY WRECKS



A number of "treasure" wrecks have been lost in the waters of Lake Champlain.

craft, also the *Linnet*, a captured 16 gun British brig, and another gunboat unidentified at the time of the search. Both the *Eagle* and the *Linnet* were in the Battle of Plattsburgh, won by Macdonough's Yankee fleet.

Kennard stated, "We had historical records of the gunboats, but knew nothing about the other ships we found. At one point we found 12 ships within a period of seven minutes."

Speaking of Whitehall, another sunken treasure chest was lost in shallow water, practically within the village limits. This incident dates back to the outbreak of the Revolutionary War, in 1775. At that time Robert Gordon owned a trading post, known as the Red Barn, on Wood Creek just south of Whitehall. A very prosperous man, Gordon was a Tory and his neighbors gave him a hard time because of his

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CHAMPLAIN WRECKS

British sympathies. As a result, one night he loaded his family, along with a chest of money and plate, into a boat and sailed northward on Wood Creek. He intended to traverse Lake Champlain to the safety of Canada.

When Gordon reached a marshy location, called the Haven, on the west shore of the creek, he found the heavy chest of valuables was retarding his progress. Consequently, he lowered the chest into the shallow water, carefully noting the location for recovery at a later time. That time never arrived for Gordon, he disappeared while hunting in Canada.

The hunt for Gordon's treasure was spurred by an incident that occurred on September 29, 1934. Dredging work was being done at the Haven and the steel jaws of the big dipper brought up a box that rested for a moment on a mound of muck in the scoop—and then splashed back into the water.

Frequent explorations have since failed to locate what is believed to be Gordon's treasure chest. And, as this search for the old chest is renewed, new legends of lost gold and silver are in the process of being born. Yes, Lake Champlain certainly provides a vast array of history for divers to plunge into.

CEDAM EXPEDITIONS

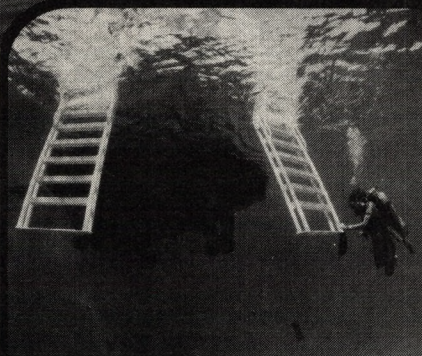
CEDAM International, the organization dedicated to Conservation, Education, Diving, Archaeology and Museums, has scheduled two major expeditions to the Caribbean next year.

July 11-18 and July 18-25 there will be a fish collection and identification expedition to Anthony's Key, Roatan. This expedition will be directed by Dr. Ernie Ernst, curator of the New York Aquarium. In addition to collecting animals for display at the aquarium, daily fish identification dives will be led by Ernst. The cost includes round trip air transportation from Miami, hotel accommodations (double occupancy), all meals, unlimited diving and transfers in Honduras.

August 1-8 there will be a Statia marine archaeology expedition. The purpose of this expedition is to study the shipwrecks off the coast of St. Eustatius (Statia). The island's history, combined with the clear waters of the Caribbean, promise to make this a fascinating and educational experience. Cost per member includes hotel accommodations (double occupancy), all meals, unlimited diving and all transfers in Statia.

CEDAM expedition expenses are tax deductible. For a copy of CEDAM's newsletter, Reef Report, a complete list of expeditions and membership information, send \$1 (for postage and handling) to: CEDAM International, Fox Road, Croton, NY 10520.

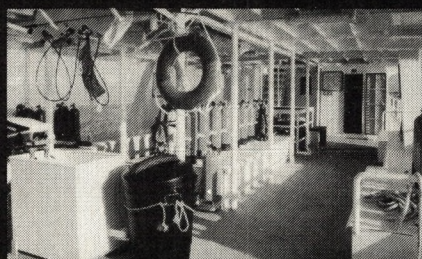
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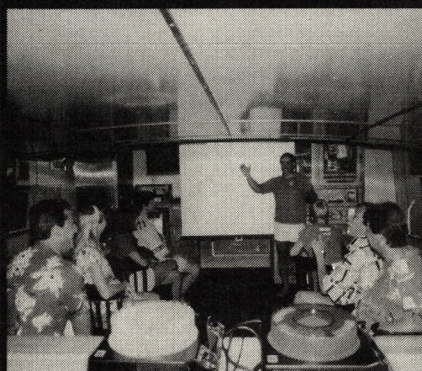
Dive ladders



Sun deck



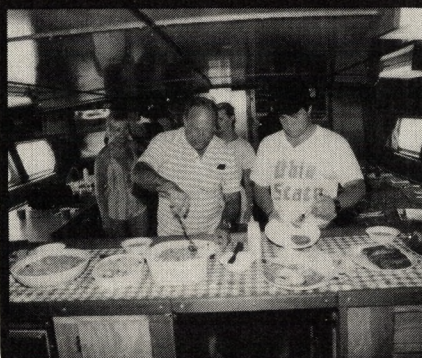
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CAVE DIVING

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**TEXT AND PHOTOGRAPHY
BY BILL BARADA**

Water-filled caves and caverns have been the problem children of the sport of skin diving throughout its history. At one time so many people died in these U/W passages it was considered a disgrace to the entire sport and anti-cave diving legislation was even supported by some prominent diving organizations.

The source of the problem was in Florida, which has the world's most extensive



Florida's caves and caverns offer clear, warm water and the thrill of exploration.

network of freeflowing springs, spring fed rivers and spring connected sinkholes. Many of these have water-filled caves that lead into extensive labyrinths of interconnected underground tunnels and caverns. Openings to Florida's cave systems are found throughout the state from the Panhandle to the Keys. They range in size from tiny tunnels to lake-sized springs such as Cypress Gardens and Silver Springs. The water in these springs and caves is crystal clear and they serve as a tremendous attraction for scuba divers who visit the area from all across the nation. This is particularly true during the winter months when freezing weather virtually prohibits diving in northern waters and the ocean off Florida is colder and more turbulent than in the summer months. But the calm, clear water of the springs and caves remains at a comfort-

able 72-74°F throughout the year. Adding to the enticement of Florida's caves is their accessibility. In most areas divers can park their cars nearby, then put on their gear and walk into the water. In England and some other countries, divers must haul their gear into inaccessible areas to explore a water-filled cave.

These are some of the reasons cave diving became so popular in Florida. By 1969 more than 100,000 divers were exploring these underground labyrinths and more than 350 separate springs and sinkholes leading to subterranean passages had been discovered. Unfortunately, this avalanche of new divers also created an avalanche of cave diving tragedies. By 1969 these caves had earned a reputation as Florida's death holes. Sixty-seven divers drowned in Florida's caves between 1960 and 1969. Ten of these deaths occurred in the first six months of 1969. Many were multiple deaths with several divers drowning together. An outraged public demanded anti-cave diving legislation and a cry of "let's pass a law" swept across the nation.

This was when SKIN DIVER Magazine first entered the picture with a series of feature articles beginning in August 1969 and continuing intermittently through 1980. Our source of information was David Desautels, a cave diving pioneer and a former member of the Florida Sheriffs' Underwater Recovery Team, who has pulled more drowned divers from the caves than any other person. Dave has now written a treatise on *The History of Cave Diving*, which he hopes to have published. This work, plus the articles in SKIN DIVER, stress that exploring water-filled underground passages is an entirely different sport from open water diving and requires highly specialized equipment and techniques not needed or used in other types of diving. The message proclaimed by SKIN DIVER also warned that the safety education, training and certified instruction so effective in achieving safe scuba diving in open water do not qualify a person to enter a cave safely. In fact, regular scuba training may actually be worse than useless in a cave because it tends to encourage overconfidence. We stressed the fact that only experienced cave divers are qualified to give the specialized training this sport requires. A few examples of past tragedies will illustrate this point.

In *The Silent World*, written by Jacques Cousteau and Frederick Dumas in the early 1950s, Cousteau states their worst experience in 5,000 dives did not come from the sea but an inland water cave. In this cave, The Fountain of Vauclaus in France, Dumas almost drowned owing to a combination of narcosis and depth.

Another famous diver who became a victim of caves was Conrad Limbaugh of the Scripps Institution of Oceanography, La Jolla, California. Limbaugh is considered the father of scuba instruction and safety procedures. He drowned in a

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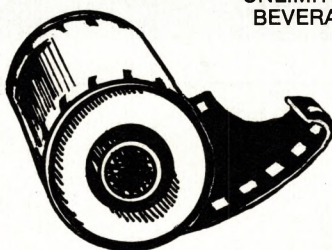
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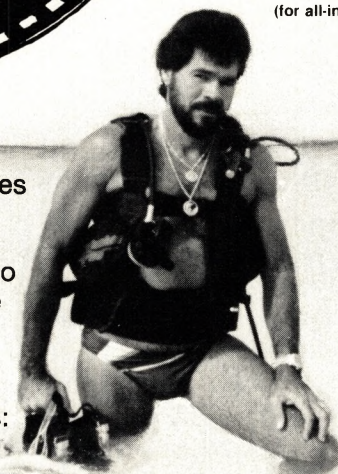
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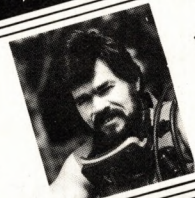
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CAVE DIVING

French cave after becoming separated from his guide and disoriented while out of sight of the cave opening.

It is significant that of the 18 divers who drowned in Florida caves in 1972, all were certified, most were experienced in open water and many were instructors.

This is the insidious nature of cave diving. Sunlight penetrates the clear water for great distances inside the entrance and broken, jagged openings lead off in all directions. Huge caverns with branching rooms and crevices invite side trips and the eerie beauty has a tantalizing fascination. Also, in a cave you swim along a downward slope beneath a ceiling and depth is deceiving so it is easy to reach



Owing to stirred up silt, the visibility in a U/W cave can suddenly be reduced to nil.

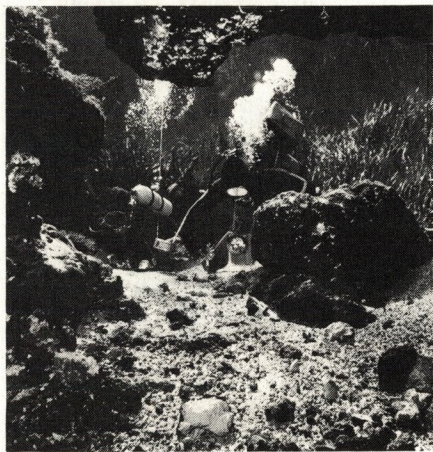
200-250 feet without realizing it. You must also remember that it requires as much—or more—air to swim back out as it did to go in. Unlike open water, you can't just head upward to the surface after you hit your reserve. And, if your buddy gets into trouble, a cave diving rescue usually means buddy breathing through hundreds of feet of winding tunnels. That's why experienced cave divers follow the rule of thirds. They use one-third of their air on the way in, one-third on the way out and save one-third for emergencies. And, most experienced cavers utilize triple tanks.

As Desautels points out, panic appears to be a major contributor to cave diving accidents. In a number of recoveries, divers still had air in their tanks and their regulators worked normally, but were out of their mouths.

These were some of the special problems of cave diving that were described in SKIN DIVER articles, but we also insisted the solution was education and training, not legislation. We pointed out that similar problems were encountered in the early days of scuba diving and the same cry of "let's pass a law" had been countered with the development of education, instruction and training by certified instructors. As a result, by 1969 America's estimated three million open water divers were racking up an incredible safety record with the percentage of underwater drownings less than that for

swimmers and the percentage of injuries less than that of water or snow skiing. The SKIN DIVER articles also stated that Florida diving was moving in the same direction and needed help.

A handful of Florida cave divers had accumulated experience and developed techniques and equipment that permitted safe penetrations of more than 2,000 feet and reaching depths of more than 260



Specialized gear, including lights and guidelines, is necessary for cave diving.

feet. This expertise was utilized by scientists and educators to explore underground passages in other areas and led to the discovery of prehistoric bones, arrowheads, stalagmites and other historical artifacts.

But formal training and certification for cave diving was not initiated until the National Association for Cave Diving (NACD) was formed in 1968. As reported in SKIN DIVER, this was in reaction to the rash of cave diving fatalities in the 1960s and the demand for legislation.

Desautels states the NACD was incorporated in July 1969—the first instructors were certified, and formal cave diver training initiated, in 1970. Educational material was also written and published, a speaker's bureau was formed and a cave diving manual was published. A list of certified cave diving instructors was published along with the location of certified cave diving training courses.

But, as SKIN DIVER reported in 1974, cave diving remained the ugly duckling of the scuba fraternity—who generally ignored it and wished it would go away—and the cave diving drownings continued. As late as 1980, SKIN DIVER readers complained the number of cave fatalities was jacking up insurance prices for all types of diving and articles warning of the dangers had a negative impact because the number of deaths increased after each publication. But, the magazine reported that conditions were improving. Most of the specialized cave diving gear had become available as standard scuba equipment and NACD training programs were available with an underground

(Continued on Page 118)

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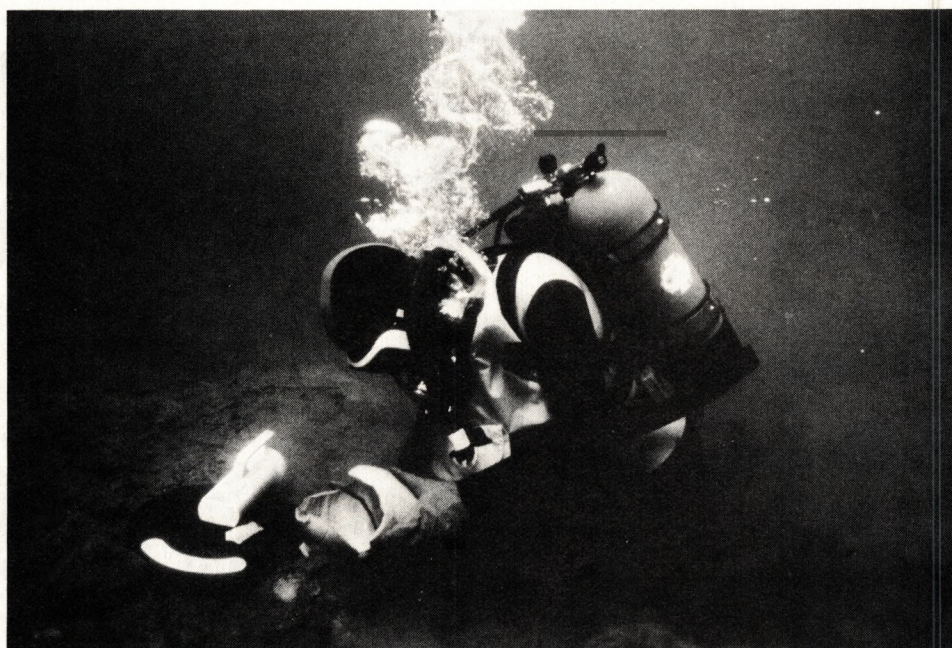
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WAR RELICS

Quebec's Historic
Richelieu River was
An Important Waterway

TEXT AND PHOTOGRAPHY
BY DEREK R. GROUT



photo/J.M. Kennah

"The beauty of this place is that you never know what you're going to find. Every dive is different."

Sean Gilmore certainly knows what he's talking about, having dived Quebec's Richelieu River for more than 25 years. He also happens to be one of the most knowledgeable divers I've ever met and listening to him is an education.

Sean smiled quickly in encouragement, adjusted his mask and rolled over the side of the aluminum boat. The Richelieu was clear that day and I could see the July sun glinting off his yellow tank as he methodically began to work the river bank 20 feet below. I rolled over the side to join him on the bottom.

One could easily be excused for think-

The author examines large pottery fragments from an early 19th century jug. He also holds an U/W metal detector.

ing that a short stretch of this historic river, dived for so long, would have been picked clean of artifacts, but such is not the case. In the summer hardly a day goes by without divers coming across

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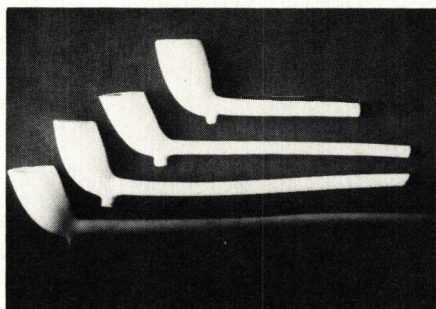
relics from the turbulent French and Indian War, the American Revolution or the War of 1812. Patient, eagle-eyed divers are rewarded with an arrowhead or spearpoint, fragments of crude Indian pottery, musketballs, cannonballs, decorated pewter or brass buttons, musket flints, clay pipes, bottles or other objects relating to the role of Ile-aux-Noix (Nut Island) as an important military base. Divers also bring up coins and tokens from the colonial period. My earliest coin is a well-worn silver two reales piece minted in 1716 in Mexico City. This is somewhat unusual, for more typical finds are British and American copper coins and Canadian tokens from 1820-1840.

For Sean it was an ordinary dive. Back on the boat two hours later he showed me a handful of small finds, uncovered by patiently fanning the silt: two buttons, three lead musketballs, the stem of a clay pipe, two handmade brass pins and a musket flint. Not bad, I thought, but then Sean is a painstaking diver who knows what to look for. Our guess is that more than 80 percent of the divers who visit the site wouldn't recognize an artifact if it tapped them on the shoulder.

While I wolfed down a sandwich, Sean moved the boat to another location. As we passed the wharf he pointed out some of the features of the fortifications and began relating some of the island's fascinating history.

First fortified in the spring of 1759 by

the French, retreating from Lake Champlain, the star-shaped defenses of Ile-aux-Noix were attacked in the summer of 1760 by a British army of 3,400 men and 40 cannon under the command of Colonel William de Haviland. His instructions were to take the 210 acre island before proceeding to Montreal. His opponent, Colonel Louis-Antoine de Bougainville, had about 1,400 men and 70 guns and for four days the two sides exchanged heavy fire. Running short of food, de Bou-



These are English tobacco pipes found near Ile-aux-Noix, circa 1815. The pipes are fragile, often found with broken stems.

gainville finally received orders from the governor in Montreal to evacuate the island and, under cover of darkness, the French garrison reached the west shore of the river. They left behind an officer

and 60 soldiers to tend the wounded and provide covering fire. On August 28, Ile-aux-Noix surrendered, followed by the capitulation of New France on September 8. Shortly afterward the British General Jeffrey Amherst visited the island and reported the French had erected "... upon this island ... such a number of works as to render it, by all accounts, impregnable, and everyone agrees who has taken a view of them that Ile-aux-Noix had it been attacked, would have been the churchyard of the British Army."

Nothing further of military significance occurred on the island until September 5, 1775 when an American army under General Philip Schuyler occupied the site, using it as a base for his advance to the St. Lawrence River and Quebec. For various reasons, the French Canadians rejected the invitation to join the revolution and the Americans were ultimately obliged to withdraw from Montreal. Ravaged by smallpox, the haggard militiamen retreated from Ile-aux-Noix on June 29 and their places were swiftly taken by Hessian mercenaries. The island then became a staging point for ill-fated British invasions of the United States under Carleton and Burgoyne. New defenses were built and in 1782 stone fortifications were started. When the Treaty of Paris ended the fighting a year later, Ile-aux-Noix was forgotten for 25 years.

During the War of 1812, the old fortifications were hurriedly repaired and Ile-

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WAR RELICS

aux-Noix became an important base with a shipyard, barracks, hospital and storehouses. The first vessel launched from the island was the *Niagara* (later renamed *Linnet*), a brig with 16 guns, in August 1814. In the same month, the largest warship ever seen on the Richelieu slid into the water. She was a 1,200 ton giant, the 36 gun frigate *Confiance*. With shipwrights still working feverishly on her, the *Confiance* and her crew of 325 sailed southward to Lake Champlain, meeting defeat along with the rest of the British flotilla at the Battle of Plattsburg on September 11. A dozen one gun galleys were also built at the shipyard and saw action at Plattsburg.

With the coming of peace, the British embarked on a grand scheme to fortify the strategic island, lying only a dozen miles north of the U.S. border. The earthworks and buildings of Fort Lennox seen by visitors today date from 1819-28. The only moated fort in Canada, Fort Lennox was named after Charles Lennox, the governor-general of Canada who died in 1819. Completion of canals on the Richelieu and the coming of the railroad reduced the usefulness of the fort and the

naval station was closed in 1834. Used briefly as a prison during the rebellion of 1837 in lower Canada, the island was thinly garrisoned until the Civil War, when troops were rushed from England in anticipation of hostilities with Union troops.

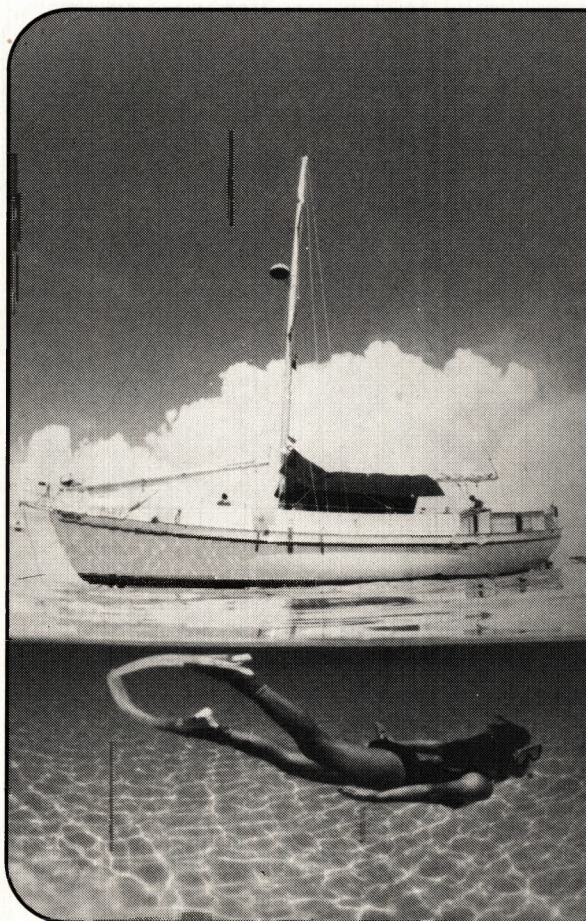
The last British troops were withdrawn in 1870 and Fort Lennox was left in peace with its memories of more turbu-

lent times. During World War II it was used by the Canadian government as an internment camp.

The Richelieu at Ile-aux-Noix was first dived in a systematic manner in the summer of 1960 by Sean Gilmore and Walter Zacharchuk. They carefully plotted their underwater finds on a large scale map to pinpoint the locations of old wharves and



A British hat badge from the 76th regiment. Such artifacts are found by gently fanning.



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mooring areas. Walter went on to set up an underwater archaeology section for the Canadian government and is currently acting as a consultant for the *Atocha* project in the Florida Keys.

The stories Sean and Walter recount are fascinating. It was not unusual, for example, to find, on a single weekend, a musket, dozens of musketballs and a hand-blown bottle of black glass, all exposed on the river bottom. More than a ton of artifacts recovered by these divers was sold in 1964 to the Canadian government and became the nucleus of the permanent collection of the U/W archaeology section of Parks Canada in Ottawa.

Times have changed, of course. Lucky divers can still find artifacts exposed on the river bed, but nowadays most divers resort to carefully fanning a small stretch of the bottom to remove the dusting of silt. Hands work well, but to move more silt and thus increase the chances of finding something, some divers bring a Ping-Pong paddle or an old fin. Others have a downthrustrer fitted to a boat propeller to blast away the silt. Working with Sean Gilmore, I've also used air lifts and water pumps to get down to the hard clay along the banks where artifacts can be found. Metal detectors will help the diver find objects like musketballs, grapeshot, belt buckles or heads stamped with the broad arrow that denotes Crown property.

Even nondivers can get in on the

search. When Sean and I visit the island we always spend a half hour checking the narrow beaches to see what objects the elements have exposed. Over the years I've managed to find regimental buttons, arrowheads, trade beads, clay pipes and brass shoe buckles.

Of course, there's a large element of luck involved. A few years ago, for example, while conducting a student checkout, I happened to spot a pottery fragment the size of a coin on the bottom. I stopped the group and started to dig. Within seconds I was enveloped in a billowing cloud of silt. My fingers quickly told me that the "fragment" was considerably larger than I'd thought and, in a couple of minutes, I had carefully removed from the silt an intact glazed earthenware jug from the early 1800s, some 13 inches in height. As I emerged from the cloud holding the jug, one student nearly spit out his regulator in surprise. After that, my students finished their checkout with faces glued to the bottom.

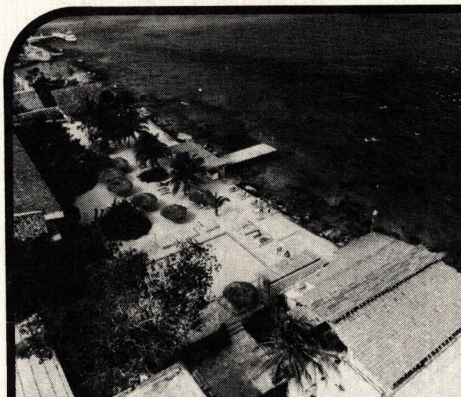
On another occasion I happened to stick my right hand in the mud for balance and the little finger entered the bowl of a clay pipe. I dug it out and was rewarded with an eight inch clay pipe from about 1815.

Indian artifacts like arrowheads, spear points and pottery fragments are especially nice to find for they provide links to a people who left no other records of

themselves. An anthropologist at McGill University in Montreal identified one of my spearpoints, about four inches in length, as dating from 2500 B.C. to 500 A.D. Pottery fragments are usually made of coarse clay and the surfaces are decorated with incised patterns.

It was Sean Gilmore who found one of the most interesting Indian artifacts, an elaborate soapstone pipe about four inches in length and one and one-half inches in height. Dating from about 1100 A.D. and originating in the Midwest, the platform of the pipe is carved in the form of an elm leaf. The pipe could still be smoked today.

If you asked Sean Gilmore about his favorite find, he would show you a beautifully restored Paget cavalry musket. Then he'd tell you about finding it in 1981 while working with a downthrustrer. It was buried deep in the silt and the first thing he saw was the shiny brass butt plate. The flintlock was in mint condition and still had a trace of gun blue on the barrel. Sean had the weapon restored professionally at Queen's University in Kingston and after three years of treatment, the brass fittings gleam as brightly as they did when some soldier accidentally dropped the gun into 15 feet of water. You can still see the Crown insignia on the lock mechanism and note the inscription on the butt plate: "XIX LD," the 19th Light Dragoons. The trigger guard is en-



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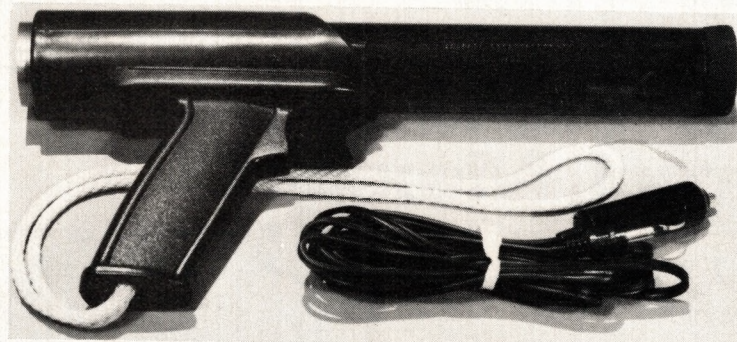
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WAR RELICS

graved "C/31," for the 31st Company.

The weapon is short, just more than two and one-half feet, and fires a one half-inch ball. Produced from 1808 to 1815, the Paget carbine was in use with British forces until the 1830s. One of the most interesting features of the weapon is the ramrod, held in place below the muzzle by a clever swivel, so the ramrod could never get lost in the heat of battle.

Fort Lennox is maintained by Parks Canada, and visitors can wander at will around the various buildings, including a small museum in the officer's quarters adjacent to the main gate. The Parks Canada staff dresses in period British uniforms and offers guided tours of the fort. There are additional displays in the barracks and powder magazines to give visitors an idea of how soldiers lived and fought on the frontiers of the Empire in the early 19th century. Other exhibits trace the development of the shipyards on Ile-aux-Noix. For nondivers there are nature tours on weekends and special activities for children.

Access to the island is easy if you have a boat, which can be launched from the marinas on the west bank of the Richelieu in the village of St. Paul-de-l'Ile-aux-Noix. For those without a boat, Parks Canada runs a small shuttle ferry (May to mid-October) from the visitor's center a quarter-mile south of the village, at the end of the quay. You can call the visitor's center at (514) 291-3454. Divers can take their equipment on board the ferry and then haul it across the island to the east channel. The trek is not a short one, and you'll need to be in shape for this. For large enough groups, the boatman will take you and your gear directly to the east channel. Make sure you ask the boatman what time the last ferry leaves the island in the afternoon; usually, it's 5:30. There are also rowboats and motorboats available for rent at the marinas in St. Paul.

Virtually all diving at Ile-aux-Noix is done in the Richelieu's east channel. Here, there is a maximum depth of 30 feet and this makes for long bottom times, especially if a diver works the shallower areas near the banks. This section of the river is very popular with boaters and waterskiers in the summer months and it is imperative that divers fly a flag.

Silt ranges in depth from an inch or so in the channel to three feet along the banks. Still, that shouldn't discourage the keen diver. After all, if there were no silt the artifacts would have disappeared years ago. While the advantages of a metal detector are obvious, you can still make nice finds without one.


The current in the Richelieu is strongest in the late spring months but even in the summer it is enough to carry away the silt

as you work along the bottom. Divers searching for artifacts usually work into the current so their vision is not obstructed. Visibility in early June is about six feet and increases by September to more than 20 feet on a good day. Water temperatures range from the mid 60s (°F) in June to the low 70s in late August, making it possible for a diver to spend almost two hours on the bottom on a single tank without feeling cold. My favorite season is after Labor Day, when the boat traffic disappears and the vibrant autumn colors make the place a photographer's delight.

What do you look for? Literally, anything that seems unusual or out of place. Look for telltale straight lines under the silt or odd bits and pieces of artifacts poking through the mud. Remember that most artifacts will sink slowly through the soft silt until they reach the hard clay bed. Once you get to this level, keep your eyes open. Most importantly, go to the museum in the fort to see the kinds of objects used by the soldiers and try to visualize these when diving. At the moment there are no restrictions on removing artifacts from the water but, if you find something of great historical significance, you might mention it to the museum staff as a courtesy. Note, however, that the island itself is a National Historic Park and consequently it is illegal to dig on land. Anything you turn up on the beach is yours.

There is an air station conveniently nearby in St. Jean-sur-Richelieu, some 12 miles north of St. Paul. There the friendly staff of Réal Béchard Sport (telephone 346-3726) will be happy to fill your tank and suggest other dive sites in the Richelieu. Another air station is at Sleepy Hollow campground, on the east bank of the river six miles south of the island. To get to Sleepy Hollow, cross the river on the bridge and take the first road to the right for about one mile. There are also numerous dive shops in Montreal, 35 miles to the northwest. Camping is not allowed on Ile-aux-Noix but there are commercial campgrounds in the area.

As you explore the historic Richelieu and sample some of the best freshwater diving in the province of Quebec, remember you are diving one of the most important water highways of early Canada. Think of those who have gone before you on this link between the heartland of French Canada and the Thirteen Colonies: Indians, French explorers such as Samuel de Champlain, American soldiers, grand armies of British redcoats and sailors. Each of these groups has left traces of its passage at Ile-aux-Noix. All you have to do is find them.

On a cold, snowy day last winter Sean and I started talking about the upcoming diving season and what he hoped to accomplish. At one point he commented he hoped to dive for many more years at the island. That was all the encouragement I needed. If Sean thinks it's worthwhile after all these years, there must still be a lot left at Ile-aux-Noix. 

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TECHNIFACTS

(Continued from Page 60)

letters will be shared with you.

"A book titled *A Guide to Underwater Photography* by Rebikoff and Cherney (published in 1955) lists a number of underwater films not mentioned in the December SDM." The reader added, "Most of these would be of particular interest. William Beebe's films of 1934 would almost certainly be found with the New York Zoological Society, for whom he worked. Dimitri Rebikoff's films, including *Coral Palace*, are worth finding." A final bit of information was, "You may also be interested in knowing that one of the largest collections of underwater films in Europe is held by the British Sub Aqua Club in London. They have been collecting since their founding in 1953."

Several readers filled in some gaps in the data on *Wake of the Red Witch*: "One of my oceanfront neighbors on the Balboa Peninsula was a commercial diver named Biddle Dorsey who was John Wayne's double for that film." Another reader wrote, "*Wake of the Red Witch*, Republic Pictures, 1948; black and white film; running time 106 minutes. Wayne fights giant squid to recover pearls."

Two other underwater films starring John Wayne: "*Adventure's End*; a pearl diving film (free diving). Running time 68 minutes. Wayne plays a Pacific Isle pearl diver who later signs on as a whaler. Some good diving scenes." As regards John Wayne (one more time), "*Reap the Wild Wind* is a hardhat diving story. Running time 124 minutes. Released in 1942. Wayne plays a ship's captain (what else?) who sinks a ship for salvage. While being tried for the crime he is allowed to make a dive on the wreck to collect evidence and is killed by a giant squid." As an afterthought this reader tells us, "John Wayne made 175 films. This is one of only four times John was killed in a movie. The movie has some reasonable footage."

SUBMARINE FILM

A reader wrote, "There is a commercial motion picture of which I do not know the title. However, I do know the story is a fictionalized version of two submarine disasters. The film depicts the ramming of the sub by a unit of the fleet while on maneuvers. Further, the film also utilized the rescue and salvage techniques of the submarine *Squalus* disaster. Can any reader identify this movie for me?"

The submarine *S-51* was rammed and sunk by a merchant vessel *City of Rome*. The sub that was rammed by a "fleet" unit was the *S-4*. She was rammed and sunk by a Coast Guard cutter. The submarine *F-4* was also rammed by a unit of

the fleet off Honolulu about 1910. The submarine *Squalus* sank owing to operational failure in 1939 (see *Squalus* Salvage p120). The same method of salvage was used in raising all four of the boats just mentioned with modifications and improvements with each salvage, commencing with the *F-4* in 1910. However, the rescue of personnel from a sunken sub was accomplished for the first, and only, time on the *Squalus* in May 1939.

Do readers know of a film that combined the elements of salvage techniques used on all four of the submarine disasters with the rescue of personnel used only for the *Squalus* disaster?

THANK YOU, READERS

I would like to thank the Technifacts readers who wrote about subjects discussed in this month's column: Captain Ronald L. Stem, U.S. Army Reserve; Jim Conway, Pinson, Alabama; Alan Whitehead, Greenwood, MS; Patrick Peters, Vineland, NJ; John W. Miller, Newport Beach, CA; Graham Hayes, Point Roberts, WA; and John Penzer, Saratoga Springs, NY. ✉

CHUB CAY

(Continued from Page 62)

Perhaps the easiest shallow reef to locate is Salad Bowl, just off Mamma Rhoda Rock at the entrance of the channel to Chub Cay. It is also one of the finest snorkel and shallow scuba dives to be found anywhere in the area. As viewed from the air, the basic coral configuration is spur and groove, but from beneath the surface Salad Bar is a magnificent confluence of staghorn and elkhorn corals populated by grunt, trumpetfish, goatfish and to a lesser extent, squirrelfish and bigeye. There are sand channels with coral heads harboring lobster and spider crab in 20 feet of water. Absolutely pristine elkhorn corals rise to within inches of the surface. For delicate corals such as elkhorn and staghorn to lie undamaged so near the surface is testimony to the ecological concerns of visiting divers and snorkelers and also to the protection from the prevailing winds enjoyed by most of the Chub Cay dive sites. The best diving lies to the south of the island, with prevailing winds from the northeast to east, leaving the majority of the dive area in a protected lee. The Chub Cay diving experience is not only fascinating, but given the consistent protection from the wind and the overall professionalism of Neal Watson's Chub Cay Undersea Adventures, it is a predictably fine dive vacation value.

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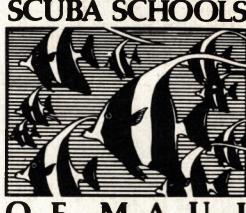
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WRECK FACTS

(Continued from Page 14)

cal artifacts made by Peruvian Indians for church services were of great historical significance. Gridding, mapping, surveying and further discoveries of treasure are still being conducted on both the *Atocha* and *Santa Margarita*.

Treasure ships of the Great Lakes are few and far between, but Gary Kozak found the fabled *Dean Richmond*, Lake Erie's most sought after ghost ship. Kozak, who works for Klein Associates in Salem, New Hampshire—manufacturers of sidescan sonar systems—is an expert in this field. In nine years of searching, he discovered 30 other wrecks before he sidescanned the *Richmond*, upside down in 100 feet of water. Lost in a raging storm in Lake Erie in 1893, the vessel was rumored to have a large shipment of gold aboard, secretly brought to the dock by American Express just before the ship sailed. Kozak salvaged tons of lead and zinc ingots, the ship's compass, china-ware and a few bags of flour. The flour was intact, but turned rancid when brought topside. Kozak never found the \$36,000 worth of gold purported to be aboard ship. He doesn't think it's there, nor could he, in eight years of research, discover any confirmation of a gold shipment by American Express. Kozak did not, however, find the ship's safe and doesn't rule out the possibility of gold being aboard the famous wreck.

Fred Stonehouse, historian and author of five books about Lake Superior—including a recent best seller: *The Wreck of the Edmund Fitzgerald*—showed slides of wrecks off Whitefish Point. The point, known as the Graveyard of Lake Superior, contains more wrecks than any other area of the lake. Heavy congestion of ships, dense fog and storms that rage from the northwest, building monstrous seas, have taken a terrible toll. The *M.M. Drake*, a 200 foot long wooden steamer, sunk in 1901, was towing the schooner-barge *Michigan* in heavy seas. When the *Michigan* started taking on water, the *Drake* pulled alongside to help. But a huge wave knocked the vessels together causing the *Drake's* stack to topple over. Her boiler fire was quenched and soon she foundered. The *Michigan* also went down. Fortunately, two nearby vessels picked up distress signals and rescued all hands except one.

Dave Trotter, Dearborn, Michigan, has located and documented several old wrecks including the schooner *Defiance*. Sunk in 1855 when she collided with the *Audubon*, the *Defiance* is scattered on the bottom of Lake Huron, 130 feet deep. Trotter's pictures showed the sides laid open, but the bow intact. The center-board remains in place with the rudder embedded in the lake's floor. The crutch

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Recommended by Gourmet Magazine, the Old Gin House is known for its fabulous food, including candlelight dinners with wine. It is located right on the water, and it has a fully-equipped, in-house NAUI and PADI dive facility in addition to 20 individually decorated rooms, 2 congenial bars, and a freshwater swimming pool.

For reservations and information about our dive packages, call or write airmail: The Old Gin House, St. Eustatius, Netherlands Antilles. 011-599-3-2319. 800 223-5581. N.Y. 212 535-9530.

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and wheel of the 120 foot long schooner were found in the wreckage. Trotter searched various archives before he found a clipping from 1855 describing the demise of the *Defiance*.

Jack O’Keefe, Marseille, Illinois, captured the overall sentiments of the audience when he said: “Phantoms of the Fathoms revealed some very interesting shipwrecks I didn’t know about and gave me further insight on others I have researched over the years. I’ll be back next year to see what other ships are presented, both in the Great Lakes and around the world.”

Safe diving to all. Be sure to include a stamped, self-addressed envelope when writing: Ellsworth Boyd, 1120 Bernoudy Rd., White Hall, MD 21161.

EDITORIAL

(Continued from Page 6)

James Brown of NAUI, Jeff Nadler of PADI and Carl Henger, owner of Black Bart’s Aquatics dive store.

By mid-summer the coalition convened its first meeting to discuss various approaches to the problem. It was agreed the first step in combating the situation would be the production of a public information brochure—advising divers of what steps they should take to respect the homeowner’s rights and prevent damage to marine life.

Among the points highlighted in the brochure are such commonsense steps as keeping noise to a minimum, especially in the early morning or night. Honking horns, blasts from air tank valves and clanking cylinders can be very annoying to sleeping residents. Flashing dive lights (at night) at the windows of nearby homes is another no-no.

The brochure also urges divers not to park in posted no parking zones, even for the purpose of loading or unloading. Blocking driveways, stairways and sidewalks is also a cardinal sin. Divers are requested to use discretion in dressing and undressing in public.

In all, there are 11 suggested points of basic diver etiquette—simply good manners every diver should observe. Also included in the brochure are four good suggestions for scuba instructors—tips on equipment management, dive site selection and etiquette training.

We got lucky this time. There were a few sharp folks in the diving community who responded quickly and came up with a workable alternative to the prohibition of beach diving.

If you would like a sample copy of this brochure on diver etiquette, send a self-addressed, stamped envelope to: Laguna Beach Brochure, c/o PADI, 1243 E. Warner Avenue, Santa Ana, CA 92705.

Where will the next attempted beach closure occur? No one can say for sure, but divers (you and me) must remain alert and ready to respond.



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CAVE DIVING

(Continued from Page 107)

check-out and practice dives. Short courses, similar to a resort introductory diving course, plus cave diving instructor courses, were offered by the NACD with certification. Also, warning signs had been installed at a number of strategic locations and grates had been installed in some of the popular springs, barring entrance to the cave openings.

Today we are happy to report the



A guideline can be a lifesaver when a dive light fails or silt obscures visibility.

NACD now has an increasing library of textbooks, pamphlets and periodicals on cave diving and they publish a regular newsletter. This library includes complete textbooks on all aspects of cave diving. The NACD cave diver certification course is the oldest and most respected in the nation and it is also the most rigorous. Instruction in cave diving is available through most of Florida's dive shops, making it almost as available as regular diving instruction. As a result, cave diving in Florida has become as safe as ocean diving and the number of fatalities has been so drastically reduced they are almost insignificant.

All is not perfect, however. On December 30, 1985 two divers forced their way past a steel grate blocking the entrance to the cave at DeLeon Springs. Their bodies were recovered deep inside the cave tunnel the next day. Neither of these men was a trained cave diver and neither had proper cave diving equipment. Yet they proceeded past the entrance grate despite all warnings. As the old saying goes, you can lead a horse to water but you can't make him drink.

For divers who are interested, the NACD address is: P.O. Box 14492, Gainesville, FL 32604. The National Speleological Society, Cave Diving Section, in existence since 1973, also offers cave and cavern diving courses. Contact this organization at Route 1, Box 153, High Springs, FL 32643.

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NAUI CAYMAN WORKSHOP

The National Association of Underwater Instructors (NAUI) recently sponsored an instructor training workshop for all Cayman Island NAUI instructors interested in developing leadership and organizational skills. The workshop was held over three consecutive evenings at Le Club's conference facilities. It was led by NAUI's national training director, Walt Hendrick, Sr. and assisted by NAUI South Atlantic branch manager Valerie Rutledge, Ed Kasten, the Southeast regional NAUI representative and several course directors from the Caymans.

This is the first time Hendrick has offered this specialized workshop outside the U.S. The program was hosted by Surfside Watersports, Ltd.

HYPERBARIC TRANSPORT CHAMBER

The Lightweight Hyperbaric Transport Chamber (UTIL 500), designed and built by C & C Engineering of Turin, Italy, is ideal for the transportation of a diver suffering from decompression sickness in a pressurized environment of up to 2.8 atmospheres absolute (60 feet seawater) while breathing oxygen, air or mixtures. It is also used for other conditions as the best form of therapy while a victim is being transported to a hyperbaric center with medical supervision.

The unit is manufactured from carbon fiber and Kevlar, very strong, modern lightweight materials. This saves considerably on overall weight. The result is a fully portable unit weighing only 110 pounds, a fraction of the weight of conventional hyperbaric chambers of its type. It is compact and low volume, as well as being a folding unit that can be stowed away in as little as 13 cubic feet. It is suitable for transport by helicopter, fixed wing aircraft and by most forms of road or boat transportation. The entire unit is non-magnetic, corrosion proof and is pressure tested to 5.5 atmospheres absolute (150 feet seawater).

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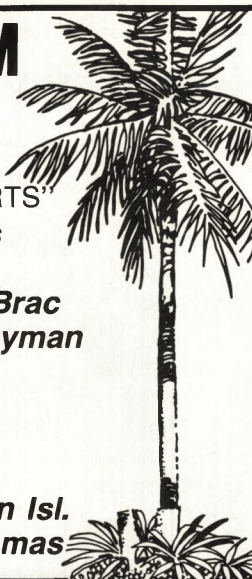
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BY E.R. CROSS

On May 23, 1939 the United States submarine USS *Squalus* sank off Portsmouth, New Hampshire with all hands. But 32 of the crew plus one civilian worker were rescued the next day. One hundred fourteen days after the disaster the *Squalus* was in drydock. It had been raised from 240 feet by the valiant efforts of 53 divers. They risked their lives making 640 dives during the desperate, frustrating work. For the sixth and last time, the *Squalus* had been raised.

This is the story of the 114 days; of the first use of oxygen-helium for deep diving in the open sea; of blow-ups from 240 feet of water; of bends cases and accidents; of the terrible danger to men working to rig pontoons weighing 35 tons each in strong currents and heavy surge; of the striking success of some divers and the stark failure of others; and of anxiety, euphoria and unconsciousness caused by nitrogen narcosis.

THE SQUALUS

In May 1939, the USS *Squalus* (pronounced "skwaylus") was one of the U.S. Navy's newest S-type submarines. She was 310 feet long and displaced some 1,500 tons on the surface and 2,000 tons when submerged. She could cruise on the surface at 16 knots. Except for one test run the boat had completed her builders' trials. That last test run was to be a crash dive from the surface—cruising at 16 knots—to a depth of 50 feet in only 60 seconds. The order, "Take her down," was given by Commanding Officer Lieutenant Oliver Naquin at 0840 on May 23, 1939. Within three minutes, the *Squalus* rested on the bottom in 240 feet of water with her three after compartments flooded and 26 of her crew dead. The forward two compartments were not flooded and 32 men were rescued during the next 40 hours (see Deep Rescue, SKIN DIVER Magazine, December 1982).

The last man was rescued from the *Squalus* a few minutes past midnight on May 25, 1939. According to a Naval officer, "We have finished lifesaving and our task has turned to that of salvage."

THE SALVORS

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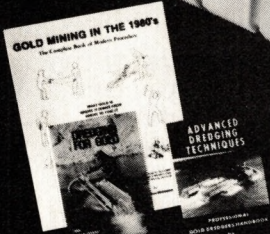
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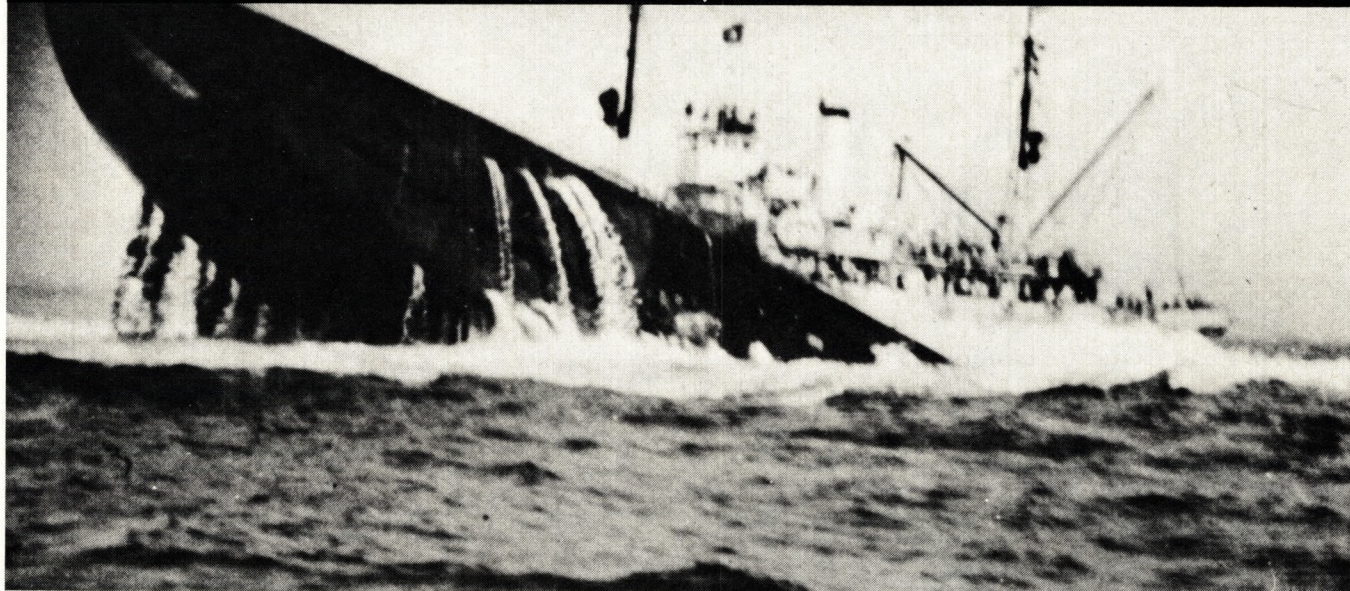
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OF THE USS SQUALUS



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Block Island in 132 feet of water in September 1925 and in recovering the USS *S-4* from 104 feet of water in December 1927. The *Falcon* and her crew were not strangers to submarine disasters.

On this operation the *Falcon* would serve a dual work role. Primarily she would be a diving platform. She would al-

so provide hyperbaric facilities for surface decompression procedures and for treatment of diver diseases or accidents.

The sister submarine USS *Sculpin* was there, too. The crew of this vessel had located the sunken *Squalus* and would now provide reserve air and other support. She was also a valuable reference



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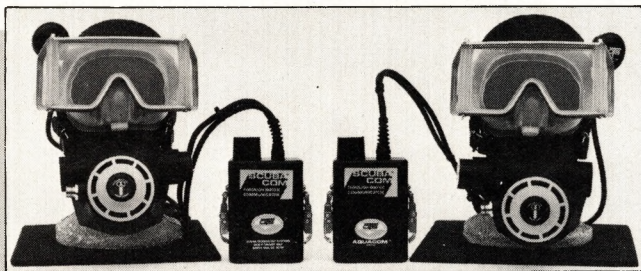
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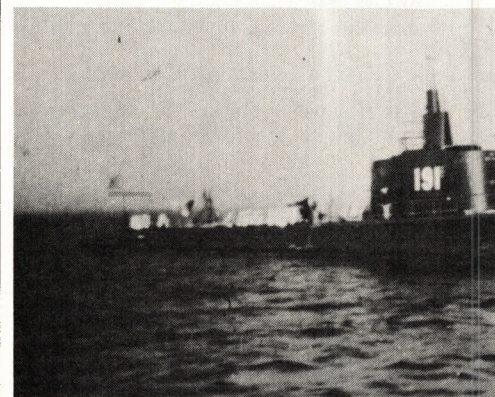
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SQUALUS

for those diving on the *Squalus*. Since they were identical vessels, the divers could locate on the *Sculpin* the fittings, valves, compartments, etc., they were going to work with on the *Squalus*. The *Sculpin* also served as flagship for Admiral Syrus Cole, commander of the salvage force.

Some of the Navy's top diving and submarine experts were at the scene: Lieutenant Commander F.A. Tusler was the salvage officer. Also, Lieutenant Commander Momsen, who had developed the Momsen submarine escape lung; Commanders A.I. McKee and A.R. McCann, developers of the submarine rescue bell; Navy diving medical specialists doctors Behnke, Yarborough and Willmon. And, there were the hundreds of



Previous page: The USS *Squalus* rises violently out of the water in the first, failed, attempt to bring it up. Above: The USS *Sculpin*, sister submarine to the *Squalus*.

enlisted men and 53 divers.

THE DIVERS

A total of 53 divers worked on the rescue of the sub crew and on a job that is referred to as one of the greatest salvage efforts of all time.

Navy divers are, invariably, tough, healthy, easygoing when not diving, psychologically well adjusted and liked by the rest of the world. But working at a depth of 240 feet put physiological and psychological stress on them they had never before experienced. The extremely cold water, currents, darkness, the weather and, frequently, lack of proper equipment and the use of new, untried equipment, caused further stress. Not one of all the divers was able to complete all of the objectives of his dives. In spite of this the salvors scored a striking success in raising the boat.

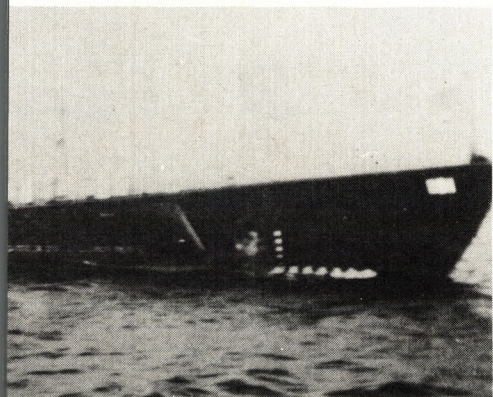
THE SALVAGE PLAN

The plan finally approved for the salvage involved techniques and equipment first used to raise the submarine *F-4* sunk

off Honolulu in 306 feet of water in March 1915. Some refinements were made in both equipment and techniques in the later salvage of the *S-51* in 1925 and the *S-4* in 1927.

Basically, the plan involved placing heavy chains and lifting slings under the hull in both the bow and stern sections of the boat. The salvage pontoons, themselves small vessels, were each 32 feet long, 12.5 feet in diameter and weighed 35 tons. Each was capable of lifting 115 tons (80 tons net lift). They would be rigged to the lifting chains—six over the flooded stern, four over the bow for the first lift. In addition, some of the compartments on the *Squalus* could be blown dry to obtain additional buoyancy.

In order to prevent an uncontrolled blow-up of the sub from deep water, it was to be raised in three stages. First, from the depth of 240 to about 160 feet; then to a depth of about 90; and finally, to a depth that would permit drydocking.



At the 90 foot depth divers could work long enough to close hatches and prepare the submarine for final tow into the harbor and drydocking.

DAY 1: MAY 26

The first day of salvage started early. *Falcon* was shifted from her mooring used for the rescue work until she was in a better position for the salvage work. By 1130 the new moor was completed. At 1136 diver J.J. Alicki went over the side and at 1140 reported he was on the deck of the *Squalus*. Diver F.E. Smith left the surface at 1141 and landed on the vessel at 1144. Both men used compressed air and standard Navy MK-V helmet diving gear. Their job was simple—attach a four inch diameter Manila line to the rail of the sub that would be used as a descent and ascent line by the divers.

Alicki reported he was unable to drag the heavy line forward and had gone back to see why Smith was not feeding him slack. He stated, "Smith was sitting on deck with his back to the rail. I let the rope go, checked Smith's control valve to see if he was getting air. Then I jerked him a few times and tried to talk to him." Alicki reported he felt very tired while on the bottom. Smith stated, "I landed on the

OUR DRY SUIT PEOPLE

Chuck Nicklin—diver, professional photographer, Ocean Quest Series, National Geographic Specials, BBC Specials; **Flip Nicklin**—diver, professional photographer, Ocean Quest Series, National Geographic Specials, BBC Specials; **Al Giddings**—diver, author, Ocean Quest Series; **Rick Rosenthal**—diver, marine biologist, underwater wildlife cinematographer; **Charles Arneson**—diver, research scientist, underwater photographer; **Eric Hanauer**—diver, underwater photographer, author; **Dr. Mia Tegner**—diver, marine biologist; **Robert McQuilkin**—diver, professional photographer, author; **Jim White**—diver, author, photographer; **Robert F. Burgess**—diver, professional author, underwater photographer; **Karl D. Anderson**—diver, author, underwater photographer; **Fred D. Leete**—master instructor, diving consultant; Search & Rescue Divers, North Slope Borough, Barrow, Alaska (North of the Arctic Circle); The Rose City Ski Team (Portland's Water Spectacular)—Competition Show Water Ski Team; **Jon Fishburn**—U.S. National Whitewater Kayaking Champion since 1982; **Elizabeth Hayman**—1981 World Champion in tandem canoe whitewater slalom event, international competitor; **Cathy Hearn**—whitewater kayak competitor, three gold medals in 1979, world championships whitewater kayaking, numerous national titles; **David Hearn**—1985 World Champion whitewater canoe slalom, four times World Champion whitewater canoe slalom team event, 16 times U.S. National Champion & 1982 Europa Cup winner; **Jon Lugbill**—7 times World Champion canoe slalom, 4 times World Champion canoe slalom team event, Europa Cup & Pan American Cup Champion several times; **Wendy Stone**—1984 U.S. National Slalom Champion, international competitor; **Brent Turner**—U.S. Olympic kayaker; **Mark Vanderwel**, **Frank T. Meyer**, **Greg Poehlein**, **Phil Epaves**, **Kevin O'Brien**, **Chara O'Brien**, **Joe Wilson**—all members 1986 American Himalayan Kayak Expedition, Seti Khola Whitewater Kayak Descent; **Martha Parker**—Owner Team One Newport; **Lynne Jewell**—U.S. Women's Olympic Sailing Campaign, 470 class; **Amy Backus**—U.S. Women's Olympic Sailing Campaign, 470 class; **Linda Penfield**—U.S. Women's Olympic Sailing Campaign, 470 class; **Bill Kenney, Jr.**—U.S. Men's Olympic Sailing Campaign, flying dutchman class; **J.B. Braun**—U.S. Men's Olympic Sailing Campaign, flying dutchman class.

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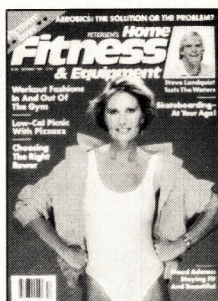
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SQUALUS

deck of the sub and was waiting for the line to come down. My next recollection was of awakening from a deep sleep. I must have passed out instantly as I have no recollection of going to sleep. I had no bad feelings before or after."

The next dive was to a depth of only 102 feet to clear some wires that had become fouled. The time of the dive was 15 minutes and it was completed without incident. Then O.L. (bo's'n) Crandall made a dive on compressed air to the deck of the submarine. He left the surface at 1524. At 1529 Crandall reported he was on the sub. Two minutes later his speech became incoherent and rambling. He was ordered to come up and was on the decompression stage at 1536. There had been four dives and three failures. Nitrogen narcosis had exacted its toll.



A Navy diver is being "dressed in" by attendants prior to a dive on the *Squalus*. The men are pulling the "bib" up to trap any water that might leak into the helmet.

It was thought the ship's diving air supply might not be properly filtered for such deep diving. Lieutenant Willmon, a diving physiologist and William Badders started a dry dive to 300 feet on air in the recompression chamber to test the air supply. At a depth of 210 feet the air supply was exhausted. They had to surface.

Day one was over. It seemed to be a presage of the way the salvage job would go during the next 112 days.

USE OF HELIOX

Experimental work with heliox (oxygen helium) diving began with the Navy in 1924 and continued through 1940. In the later stages it was at the Navy's Experi-

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mental Diving Unit. By 1943 wet dives to 500 feet in experimental dive tanks and open sea dives to 440 feet had been made. In 1937 Max Gene Nohl made a test dive to 420 feet in Lake Michigan. Contrary to expectations, the use of heliox mixes did not permit material reduction in decompression time. However, it allowed much deeper dives to be made with greater safety.

Several divers who had been rushed to the *Squalus* salvage had been stationed at the U.S. Navy Experimental Diving Unit at Washington, D.C. They had been working on developing and testing heliox for diving. However, this mixture had only been used experimentally under carefully controlled conditions.

In conventional air-supplied helmets, air freeflows constantly into and out of the helmet. Part is inhaled and then exhaled by the diver but there is no recirculation or reuse of any of the air. In the heliox mode a diving helmet has additional valves, a venturi system for recirculating the mixed gas from the helmet through a carbon dioxide absorbing canister and chemical. While the gas supply is still basically in a constant flow state, the volume of gas actually needed by the diver is small when compared with a conventional air supply system.

The 1943 U.S. Navy Diving Manual states, "Oxygen helium mixtures were used almost entirely by the divers in the salvage of the USS *Squalus*..." It is true, heliox mixes were used to some extent during the salvage but not nearly as much, and not with as much success, as almost all writers have indicated.

DAY 2: MAY 27

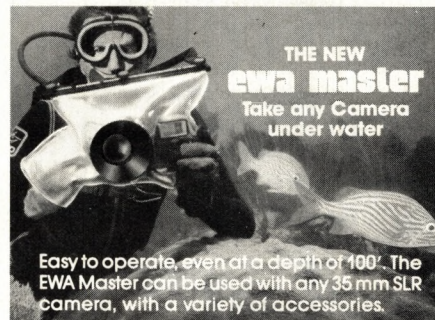
On this day the first field trial of the Navy's heliox diving rig was made by F.H. O'Keefe. His dive started at 1006. He descended to 50 feet for 15 minutes. The item of note in the log was that his nose was skinned by the tenders when they put his helmet over his head.

Later on day two, at 1130, R.M. Metzger made a test dive with the heliox rig to 100 feet. Everything worked well. Metzger stated, "I felt normal at all times. No aftereffects."

At 1255 the first working dive ever with a heliox rig was attempted by William (Bill) Badders, an excellent choice for this test of man and equipment in deep water. He was dressed in the special helmet and lowered to the bottom in 240 feet of water. He landed on the sub at 1308 and reported he was near the deck gun just aft the conning tower. He tried to drag the four inch descending line into position. According to Badders, "As I reached the gun the recirculator on the helmet seemed to gradually be losing gas supply. I opened the main control valve and the recirculating venturi tube seemed to start functioning properly again for about one minute, then started to slow down again. I felt as though I were being overcome with CO₂. I made sure I was clear

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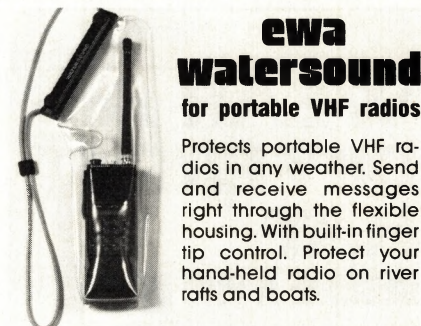


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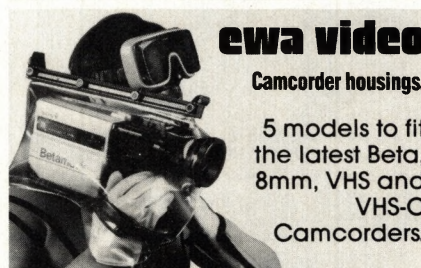


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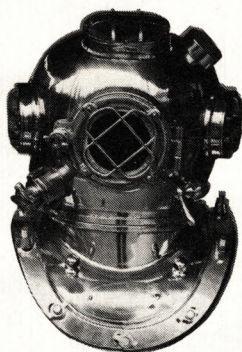
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SQUALUS

and notified topside to start bringing me up immediately. As I approached the surface my physical well being improved. I was then brought to the surface for decompression."

At 1511 A.W. Pickering made a 240 foot dive on compressed air. He was able to secure the descending line to the sub. He completed the job in nine minutes and surfaced with no ill effects. Badders and Pickering were out of the decompression chamber at 1634.

So ended day two. One line had been attached to the sunken sub.

The third and fourth uses of heliox diving systems were made on day three. Zampiglione and Gilbert descended to the submarine. Zampiglione reported no problems during a 33 minute dive. Gilbert reported that the breathing gas seemed to be shutting off at irregular intervals. Also, the main control valve failed to deliver adequate gas and his dive was aborted.

On day four Bill Badders and A.J. Vanderhayden made dives on compressed air to 240 feet. Air rushing into Badders' helmet, effects of nitrogen narcosis and the poor quality of the telephone system available made good communication impossible and the dive was terminated. Vanderhayden reported, "The dive was normal in all respects and I felt good at all times." In use at that time was the Pittsburgh sound powered telephone.

DAY 5: MAY 30

One diver reported: "Telephone reception very poor. Turned my air down to hear. From then on I felt kind of woozy. Before I could get back to normal, I was hoisted up." A second diver stated, "After reaching the submarine I waited a minute or two before attempting any work as my head was not exactly clear." Later this diver opened his helmet exhaust fully and increased the flow of air through his helmet. He said, "After that my head cleared up quickly." Martin Sibitzky, who made the first dive on the *Squalus* to hook up the rescue bell, was the third diver down that day. He related, "I was slightly dizzy on the bottom and became very dizzy when I cut down my air to listen to the telephone. I am sure I was conscious all of the time." Two more divers, Baker and Lieutenant Morrison, made dives using compressed air on day five. Both reported using "plenty of air" and were able to complete their tasks.

DAY 6: MAY 31

At 0726 John Mihalowski, who had made four trips with the bell to rescue personnel from the submarine, made a 240 foot dive using the heliox diving system with a new rack arrangement. He stated, "When I landed on the submarine I was breathing heavily for about 30 sec-

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onds. I could feel the water on my arms. It was bitterly cold. I was cold from the time I left the surface. I started to feel sort of lightheaded and thought I had better come up, so I came up. While I was on the decompression stage the gas supply came in an irregular flow."

Seven more dives were made that day and each of the divers completed his assigned tasks. All used compressed air. E.P. Clayton became fouled in his air hose slack, but was able to clear himself and make a normal ascent.

DAY 7: JUNE 1

On this day, off the English coast, the British submarine *Thetis* sank with a loss of 99 lives. Like the *Squalus*, she was on her initial sea trials.

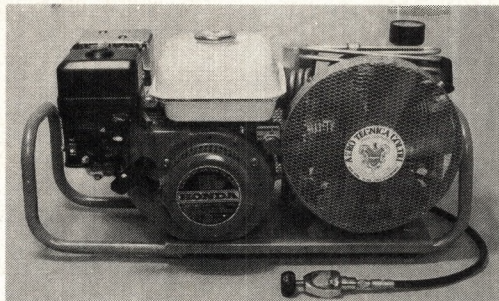


The huge pontoons used to help raise the *Squalus* smashed the sub's conning tower during the last few days of the lift.

Seven dives were made on the *Squalus* on day seven, all using compressed air. One diver stated, "I was knocked off the descending line, fell about 15 feet and landed in the mud beside the submarine. I climbed back on the boat but was unable to loosen the shackle pin." He was brought up after a 25 minute dive. A second diver stated, "While trying to cut a line loose I dropped my knife. After I found it I felt dizzy. When I increased my air supply I got worse." He was brought to the surface after six minutes.

Five dives were completed without incident and all jobs were accomplished. However, it was obvious that working dives to 240 feet were going to present problems. With compressed air the major difficulty seemed to be the effects of nitrogen narcosis. It is known that a build-up of CO₂ in the breathing gas will intensify the effect of nitrogen under pressure. The use of lots of air during the dive helped most divers with the problem but did not eliminate the potential hazards completely. The use of excess air for helmet circulation also increased the possibility of an uncontrolled blow-up from depth.

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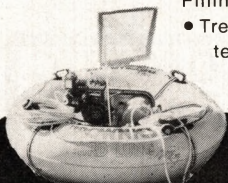
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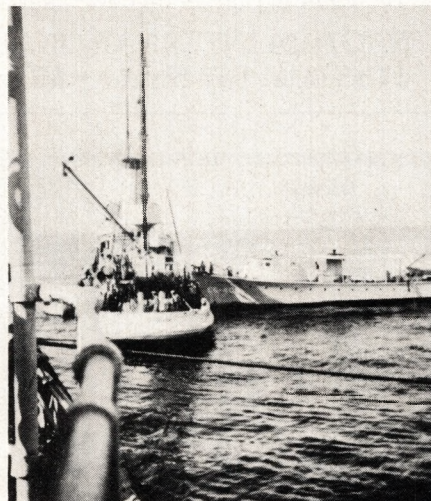
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SQUALUS

The use of the basically untried heliox dive helmet and gas system also resulted in problems. The venturi system continued to fail intermittently. This was probably owing to icing of the system that blocked, or partially blocked, the venturi system that recirculated the breathing gas mixture from the CO₂ absorbent canister back into the helmet. Again, a CO₂ build-up, even when using helium, caused problems.

A known factor of using helium mix as the breathing gas is that helium will transfer heat from the body many times faster than compressed air. Because of this the



The USS Wandank played a vital role in the *Squalus* salvage. It towed both the sub and the salvage vessel *Falcon* into port.

divers using heliox mixes suffered intense cold. Of the 14 dives made on days six and seven, 13 of them used compressed air and were basically uneventful. The dive made using heliox resulted in the diver becoming dangerously cold.

DAY 8: JUNE 2

Early on day eight Lieutenant Laing made a dive to 240 feet using a heliox gas mix with a standard air helmet; a straight, open circulation gas supply with no CO₂ scrubbing. He also used another "shocking" first—electrically heated underwear. His statements are revealing. "The dive was a very easy one with no mental disturbance. My faculties were clear at all times." Later in his report he said, "I did experience some communication difficulties due to the fact that I had the hood of the electrically heated underwear over my ears and it was also due to the fact that the lead wire to the underwear worked around between my mouth and the telephone transceiver." Still later in the dive the lieutenant recalled, "Coming up my hands got pretty cold. I called for more heat, which I felt around my

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body, but which I did not appreciably feel on my hands."

Power for the electrically heated underwear was from a direct current source, either from appropriate battery supply or from some other DC source. Current supply, and therefore the amount of heat to the diver's underwear, was controlled by adding or taking away batteries, or by a system of resistors. Neither system was very accurate, responsive or reliable. There were also cases of mild, but harmless, shock when wires became bare or the suit got wet for any of several reasons. While not hazardous the occasional shocks were a definite distraction for the diver already affected by depth.

In addition to the equipment problems and the effects of the breathing gases, the lack of experience of the divers in working at 240 feet on a sunken submarine posed problems in the first several days of the operation. The divers' physical condition also played a part since they were not able to cope, in many cases, with the extreme exertion needed. All too often, conditions similar to the one reported by a diver on day 9 occurred: "I missed the submarine and landed on the bottom; got fouled in the hose around the bottom. The exertion caused by working to clear myself tired me out completely and I had to be brought to the surface."

In spite of all the problems, the work continued. The plans called for reinforced hoses to be connected to control room air salvage fittings, forward battery and forward torpedo rooms. Also, lifting slings were to be swept under the bow of the boat. By May 31 this was done.

During June, more air hoses were connected to the several main ballast tanks. Discharge hoses were connected to the sub's port and starboard fuel oil (diesel) tanks (two on each side). Recovering the fuel from the *Squalus* proved to be quite simple. Water hoses were led from each fuel tank into an empty tank on the salvage vessel. When sea water flooded the sub's fuel tanks, the diesel fuel "floated" up the hoses and into the salvage vessel's tanks. The tanks on the sub could then be blown dry and used for flotation without creating an environmental problem and a potentially hazardous fuel spill.

Also started in June was an attempt to reeve lifting slings under the stern of the sub by the use of a special water jet lance. The original lance proved unsatisfactory. It was impossible to retain correct alignment and the diver had difficulty making up the sections of the lance while at depth in cold water. Working with the tunneling hoses started on day 10 and the final tunnel was not completed until day 26 (June 22). In the meantime a new lance was designed and constructed.

A seven inch diameter Manila tow line was rigged to the stern of the submarine on June 29. It seemed the salvage work was progressing nicely, but this was day 33. Counting the two days of rescue, the

(Continued on Page 132)

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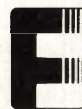
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TEXT AND PHOTOGRAPHY BY LEON LYONS, JR.

My collection of diving helmets is more than just an accumulation of objects. Each of these helmets has its own place in time. They helped man accomplish many rescues and salvages U/W which, without their invention, would have been nearly impossible. If the helmets sitting on my shelves and floor could talk, I'm sure we'd hear some wonderful, and possibly harrowing, stories.

To satisfy the questions of other nautical enthusiasts, I have written a reference book on diving helmets from all over the world, dating from the 1820s to the present. Nearly 200 are pictured. This should help other collectors identify helmets they have that do not have distinctive trademarks on them.

Many parts of the world were visited in search of these helmets and to find some printed information on the companies that manufactured them. Along the way, many friends were made. Thanks to them and my unflagging interest, a written and pictorial account of the diving helmet will have its place in history.

One of the interesting points about diving helmets is that some of them have unique designs that are very artistic looking. You wonder how someone could have imagined a certain style. It would be nice to exhibit one in an art gallery someday as a showpiece of maritime heritage. 🦑



The author has amassed an impressive collection of diving helmets from various eras and from all over the world. He has written a reference book on the subject as well. Top left: Eighteen different styles of dive helmets (20 helmets) from the Siebe Gorman Company, England, 1860-1979. Top right: Top row—first four helmets (left to right) Canadian, fifth U.S., rest French; second row—all helmets from Morse Diving Company, Massachusetts; third row—first two helmets Hale Company, Boston, rest Heinke Company, England; bottom row—first two Hagenuk Company, Germany, second two Flohr Company, Germany, rest Draeger Company, Germany. Above: German diver setup (female) and helmets waiting for shelves.

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SQUALUS

(Continued from Page 129)

divers had been working for 31 days with only two days off. Even these days were not for relaxation. The entire crew was tired and every task was an accident about to happen. There were several cases of dizziness in the divers; one was knocked off the descending line and fell the rest of the way to the ocean bottom; two missed the decompression stage on the way to the surface and had to descend quickly to the proper depth for the first in-water decompression stop at 80 feet. A warrant officer made one dive to 240 feet, surfaced after six minutes and asked to be transferred.

DAY 16: JUNE 10

This was a day of near disaster for two divers. O.S. Payne reached the submarine. He stated, "I started getting dizzy so I stopped to turn on more air to clear my head. The next thing I knew I had been hauled to the surface." His tenders reported he had blown to the surface (made an uncontrolled ascent) owing to excess air in his suit.

W.H. Squire, an experienced master diver, was working in 240 feet of water using a heliox mix. He reported, "I returned to the descending line and was standing by to come up and that was the end as far as I remember." But there was more, much more, to the story than that. A news article stated, "Squire had made a routine dive when he suddenly shot to the surface alongside the salvage ship *Falcon*. His diving suit, blown up like a toy balloon, was tangled in life lines, air hoses and descending ropes. Squire floated helplessly on the surface while two divers jumped fully clothed into the sea to untangle the diver and pull him to the side of the ship." Squire suffered an attack of the bends, the first on the job, and had to spend ten hours in the recompression chamber.

In spite of all this, the job was progressing. Diving usually started about 0730. Dives to 240 feet lasted 15 to 20 minutes. The last diver was generally brought on board and placed in the chamber at about 1830 for the 60 minutes of required surface decompression.

Decompression procedures followed for heliox diving were for the diver to take his first decompression stop at 80 or 90 feet. He was then brought to the surface and placed in the recompression chamber where the first decompression stop was repeated. This was followed by the balance of the prescribed decompression for the particular dive, usually about 90 minutes. Sometimes suits were torn and divers got wet with freezing water. Never was a dive a "comfortable" one. Perhaps this job is where the saying originated, "You never ask a diver how he feels. Just ask him where he hurts."

DAY 20: JUNE 16

On this day there was a third operational submarine disaster. The French submarine *Phenix*, with her crew of 71, was lost in 300 feet of water.

DAY 36: JULY 1

Air hoses were now rigged to the various compartments and tanks of the submarine. Preparations were started to rig and place the huge salvage pontoons that had been brought to the job. Some of them were 32 feet long by 12.5 feet in diameter and had a lifting capacity of 115 tons and a weight of 35 tons. This gave a net lift of 80 tons for each pontoon. Each was divided into three compartments and had blow and vent controls. Hawse pipes were installed in each of the



Admiral Syrus Cole (on left) aboard the *Falcon*. Admiral Cole commanded the salvage operation, which was completed 114 days after the *Squalus* went down.

two end compartments through which two and one-half inch diameter chains and lifting slings were fitted. At the prescribed depth, a stopper called a "flower pot"—because of its shape—was used. Each of these devices weighed 800 pounds and had to be locked in place by the divers. One end of each pontoon was painted white; the other end red so divers could determine which end needed to be adjusted. On a turning, unpainted pontoon, both ends look the same.

The theory was that the sub would be lightened by blowing water from the various compartments until a negative buoyancy was reached that could be overcome by the pontoons. This would prevent an uncontrolled ascent (with probably disastrous results) since, once the uppermost pontoons reached the surface, the ascent would stop.

DAY 39: JULY 4

At 1831, R.M. Metzger made a dive to one of the salvage pontoons. His report: "Landed on the pontoon. Went to the white end, saw the flower pot was in place. Hammered wedges in the flower pot. Did the same thing to the red end. Came up. The pontoon was level." Metzger was out of the decompression

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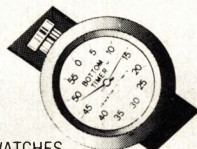
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SQUALUS

chamber at 1946. It had been a typically long day. News headlines ashore stated, "Pontoons in place to lift *Squalus*." But were they?

DAY 43: JULY 8

Martin Sibitzky made a dive on YSP-31 (YSP stands for Yard Salvage Pontoon). Sibitzky reported, "Landed on white end of pontoon. It was at an angle of about 30 degrees. Was instructed to open the vent valve, which I did. Then came up."

DAY 47: JULY 13

Five more hard working days had passed. Day 47 came in with gusty winds and rough seas. But F.E. Smith made a dive at 0602 to attach an air hose to the number two main ballast tank. He also opened the blow valve and closed the submarine's control room salvage air valve. How could the divers work and find what they were supposed to? There was now a staggering total of 28,000 feet of ropes, wires, chains and miscellaneous "things" over the side of the *Falcon* and connected to the *Squalus* or to the seven pontoons now rigged in a manner that, it was hoped, would raise the boat. A Portsmouth, New Hampshire paper reported, "Salvage ship blowing air into pontoons on *Squalus*."

The *Falcon* had three separate supplies of compressed air. There were two large compressors capable of supplying 150 cubic feet of air per minute at a pressure of 400 psi for the helmet divers. For salvage, two compressors delivered very high volumes of air at 150 psi. Emergency air was stored in large banks of compressed air cylinders. In addition, a large diameter air hose (actually a two and one-half inch fire hose being used as an air hose) ran from *Sculpin* to provide additional air to the salvage manifold. From the manifold, called the "calliope" by the divers, ran dozens of air hoses leading to the many pontoons and submarine fittings far below the surface.

By 0913 compressed air was rapidly displacing the water in both the *Squalus* and the pontoons. Bubbles were boiling to the surface. Pontoons attached to the stern of the sub came up first under perfect control. First one salvage pontoon and then a second surfaced at the bow. Only one of them was supposed to come completely to the surface. Something was wrong. Moments later the bow of the sunken sub roared out of the water. Very shortly, more than 20 feet of the 1,500 ton boat was above the surface. Headlines ashore told the story: "*Squalus* shoots to surface, sinks again; 21 divers periled as craft whips the sea."

The next day a Portsmouth newspaper headlined, "Heavy seas prevent divers from learning *Squalus* damage." Divers

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were again working underwater by day 50, July 16. The seven pontoons the divers had spent months rigging were tangled with ropes, hoses and chains but were still in place. The divers had done their work well. For five more days, the divers and the salvage crew had to strip away literally miles of wire, hoses and chains to untangle the mess left when the submarine surfaced violently and sank back to the bottom.

DAY 69: AUGUST 4

One of the most serious accidents occurred on day 69. E.B. Crosby made a dive to 240 feet using heliox. After 17 minutes he was brought toward the surface. He was given the first three decompression stops in the water at depths of 80, 60 and 50 feet, then transferred to the chamber for surface decompression procedures. While being recompressed at about the 50 foot level, he developed a severe pain in his abdomen. The recompression was continued at 130 feet. He responded to treatment and was decompressed to surface pressure over the next three hours. Crosby remained in good condition until about 1800 when he became nauseated and had serious vision problems. He was again placed in the chamber and recompressed to 200 feet. After 20 minutes at depth, his vision was normal and decompression was started again. Crosby's treatment was completed at 1030 on August 6. He was transferred to a hospital on shore for observation. Crosby was back on board the salvage vessel and diving again on August 27 and continued to dive until September 9.

During Crosby's treatment there was no diving since the chamber was not available for surface decompression or for an emergency.

On August 8, a sudden, violent thunderstorm with 50 mile per hour winds whipped the sea, delaying the attempt to raise the *Squalus*. But on August 12, newspapers told the story, "The sunken submarine was lifted 76 feet today and rested on an even keel." After divers had inspected pontoons, air hoses and fittings, the *Squalus* was towed at a speed of one knot toward shore until she again grounded at a depth of 172 feet.

At this shallower depth divers could work longer periods. Rerigging the pontoons went faster now; partly because of the shallower water but also owing to the divers' having a great deal more experience with handling the equipment. Heliox was still used for many of the dives.

DAY 78: AUGUST 13

It was Sunday and there was no diving on this day. President Roosevelt visited the salvage job.

DAY 82: AUGUST 17

All was ready and Admiral Cole opted to make the second lift. Again, thousands of feet of hoses were put into service and

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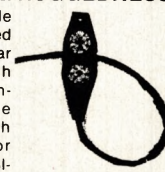
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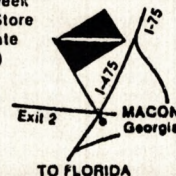
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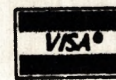
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SQUALUS

the water was forced out of the compartments of the sub and the salvage pontoons. The *Squalus* slowly floated to a preplanned depth of 92 feet. There were no problems and the sub was towed to a shallow area where it was temporarily grounded while the salvage crew made ready for the next lift.

For the next 29 days the salvage crew and divers worked long hours clearing the sub of lines, chains and hoses and rerigging pontoons, salvage hoses and tow lines for the final lift and the tow into the harbor and drydock. Now, at a depth of only 92 feet, the divers could work more hours each day. However, fog, turbidity, heavy swells and ocean currents made jobs even more difficult and hazardous. Thirty-five ton pontoons whipping back and forth in heavy ocean surges were things to be careful about.

DAY 87: AUGUST 23

Martin Sibitsky performed another first. He reported, "Took pictures of Porter (another diver working on the sub with him) and of the submarine as directed. Completed other assigned tasks. Surfaced." This is the only reference to underwater photography noted in all the reports on the salvage of the *Squalus*.

DAY 90: AUGUST 26

William Squire and Henry Frye made a dive and reported, "Working together we took off the main engine induction valve cover plate, took off the cap, screwed the valve down 43 turns." Finally, the valve that had failed to close on May 23, causing the *Squalus* to sink, was closed to the Atlantic Ocean.

DAY 92: AUGUST 28

The British submarine *Thetis* was raised this day and towed to drydock where her 99 dead were removed.

The *Squalus* was ready for what was hoped would be the last lift. High pressure air roared into the two pontoons and into the hull of the sub. The bow came to the surface first. But the vessel listed heavily to starboard, spilled out the air and sank again.

Later that day another attempt was made to float the sub. The stern was blown dry with compressed air. All the water in the hull rushed to the forward part of the vessel and the sub sank.

Two weeks of intermittent squally weather and rough seas followed. Divers and salvage crews fought the elements.

On shore, newspapers told part of the story. "September 2: Naval officials announced tonight that a pontoon had knocked off an after torpedo room hatch during the storm this week. A new hatch and a buffer to protect it would have to be installed." The following day Duncan and

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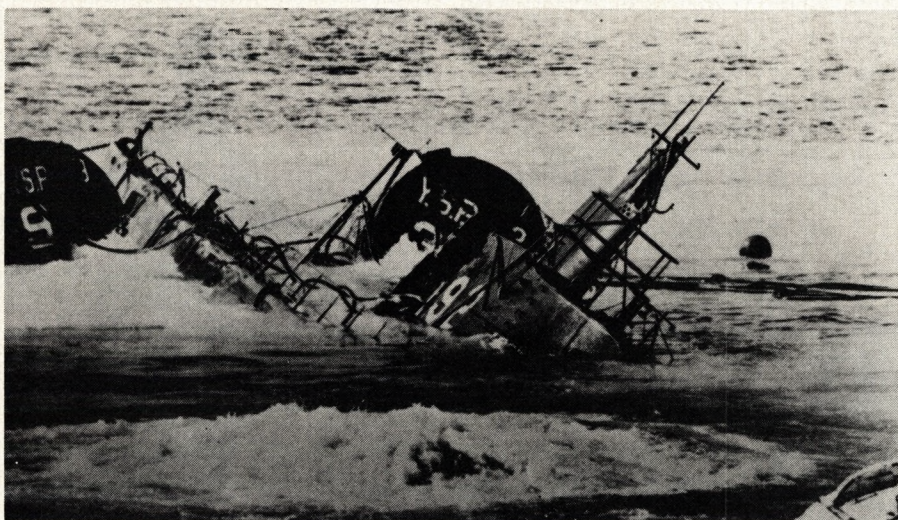
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On the fourth lift (the first from the second grounding in 90 feet of water) the *Squalus* surfaced with a pronounced starboard list and had to be put back on the bottom. She was finally stabilized on the surface more than a week later, then towed to port.

Crosby (the diver who had suffered the serious case of the bends) made a dive on the sub. Crosby reported, "Duncan and I hauled the new hatch cover that was sent down over to the hatch and secured it." The dive lasted 40 minutes.

Pontoons had also been damaged during the storm and had to be replaced.

DAY 97: SEPTEMBER 2

Diver Metzger suffered a bends hit in

his left arm. He was treated and there were no residual symptoms. He returned to duty and made one more dive on September 9.

From September 9-12 heavy seas hampered the final placement and rigging for lifting and towing the *Squalus*. Headlines in Portsmouth papers told the story. "September 11. Last *Squalus* lift due tomorrow." Then, "September 12. *Squalus* final lift slated tomorrow." And

again, "September 13. *Squalus* lifted, but sinks again." This was a report as of 0955. Later that day the *Squalus* was again floated to the surface. This time she was nearly on an even keel and the slow tow to Portsmouth and drydock began.

DAY 113: SEPTEMBER 14

"Delay again dogs *Squalus* salvage crew:" Such was a headline in a Portsmouth paper after the sub was docked temporarily. "The stern of the submarine, berthed at the Navy Yard pier, sank below the surface."

The sea was still reluctant to give up its dead. Later that night the salvage crew finally won out against her. The stern was raised and the vessel put on an almost even keel. A few minutes before midnight the doomed shipmates were removed from the vessel.

The *Squalus* was drydocked the next day—September 15, 1939; 114 days after it sank. The vessel was exactly one year old. President Roosevelt formally commended the "devotion to duty, courage, skill, initiative and self-sacrifice" of the officers and men who salvaged the sunken submarine. Every diver who worked on the *Squalus* received an award—from Congressional Medals of Honor (4), to Navy Crosses (49), to citations from the Secretary of the Navy (4). And, every one of those awards was well earned.

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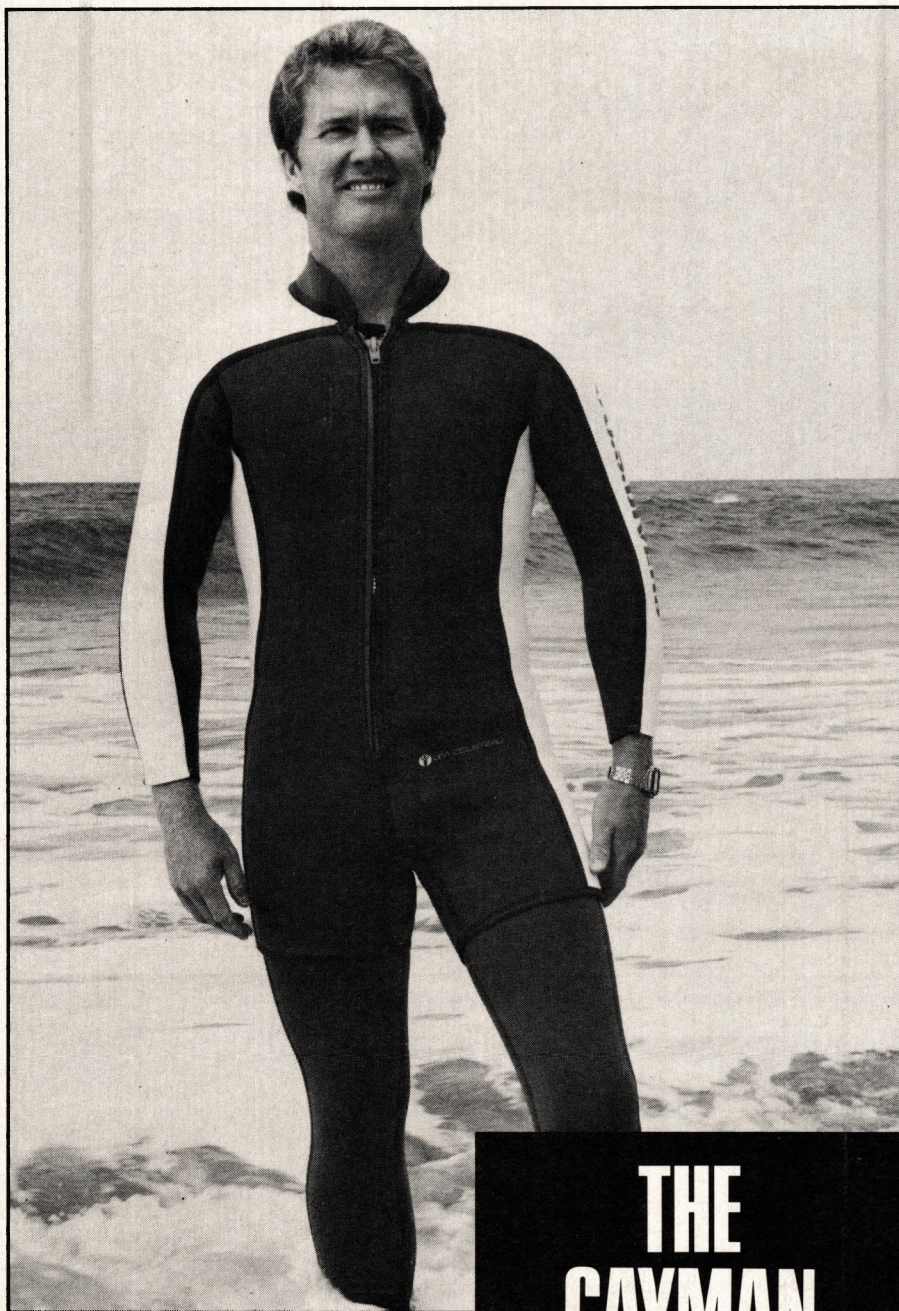
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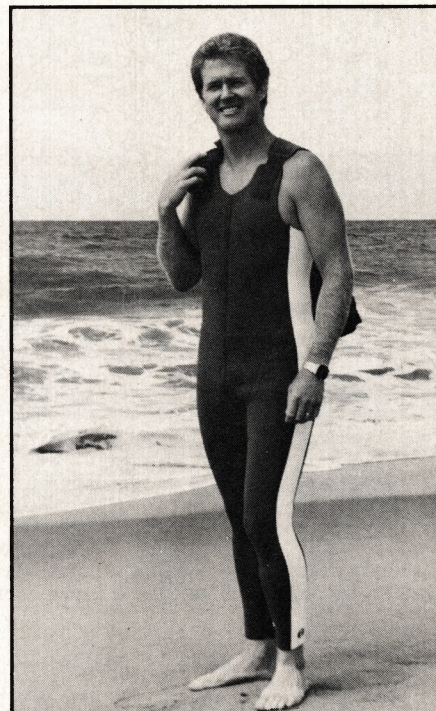
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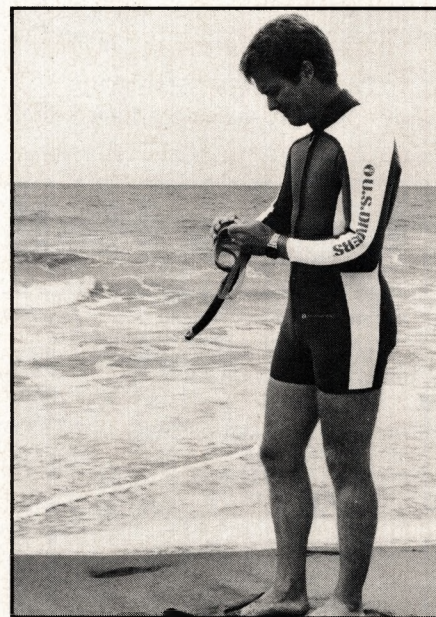
JM Cousteau Multi-Use Wetsuit

piece jumpsuit: farmer john pants and a zip-front shorty jacket. For diving, windsurfing, surfing or other wet sports enjoyed in warm water, the shorty is enough covering. For deeper diving, more complete protection from coral abrasion or for



photos/Bonnie J. Cardone

The one-eighth inch thick JM Cousteau Cayman Suit is perfect for warm water scuba diving and other watersports.



cooler water, the shorty is worn over the farmer johns.

All seams on the Cayman Suit are glued and sewn for strength. All are covered with sewn-on nylon edge tape (as are the lower edges of the shorty's legs) for added durability, comfort and good looks. The farmer johns and shorty have gusset panels built into the crotch for comfort and to relieve seam stress. The farmer john's two shoulder straps are secured with Velcro® tabs for easy dressing and individual adjustment. The shorty jacket has a built-in, rolled-over collar for comfort and increased warmth. The plastic YKK chest zipper ends just below the

waist, so there is nothing in the crotch area to pinch or bind.

The Cayman Suit is available in men's and women's styles—both in small through extra large. The women's shorty has high, French cut legs. Both styles are available in navy blue with light blue accent panels or in dark gray with yellow panels. The latter is the color suit I tested and it's an attractive combination. Wearing it, you'll be easy to locate because the yellow is ultra-bright.

The Cayman Suit was easy to don and ultra comfortable. The thin, soft neoprene molded itself to body contours and flexed easily with every movement. The suit was easy to doff as well, although without help it's a little tough to get the shoulders of the shorty down off your own. I wore the full suit as well as a hood, booties and



The Cayman's shorty top can be worn separately or over the farmer johns.

gloves for more than 30 minutes in the 67°F water mentioned earlier. I was very comfortable and only near the end of the dive did I experience any sense of cold. This was no more than what I often feel with thicker wetsuits.

If you spend your water-time in the tropics or at the surface windsurfing, waterskiing or other active pursuits, the JM Cousteau Cayman Suit might be just what you're looking for. Try one on at your U.S. Divers dealer. The suggested retail price is \$219 for the complete suit and \$115 for the shorty alone.

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I Learned About Diving From That Inlet Disaster

TEXT AND PHOTOGRAPHY BY HERB SEGARS

The tide had begun to move out and unbeknownst to us, the movement of the water was pushing us ever so gently toward the open sea. It happened slowly at first; so slowly the easy swim made the dive thoroughly enjoyable. Then the tide began to ebb faster and faster, carrying millions of gallons seaward. It was then we knew we were in trouble.

Inlet diving is extremely popular in the Northeastern United States. Entering the water approximately 15 minutes before slack low or high tide, a diver can experience 45-60 minutes of bottom time and never exceed a depth of 30 to 40 feet. With usual offshore diving depths of 70 to 90 feet, the extended bottom time is an excellent opportunity for underwater photography and general observation of undersea life. An added plus of inlet diving is that it can be done for the cost of an air fill. It is no wonder inlets are a very popular spot for budget-minded divers.

I have been inlet diving for a number of years and would not think of heading for the sea without checking a tide chart to ascertain the correct entry time. The current becomes so swift during tidal changes a diver would have to cling to outcroppings to keep from being swept away. Why then didn't I check the local tide tables while vacationing at a beautiful seaside resort a few hundred miles to the north? I don't know the answer; carelessness, I suppose! Listen to my tale and heed its warning.

Columbus Day creates pandemonium in our local dive club. It is that weekend in the late fall we pack our bags, gather up our spouses and kinder, load as much dive gear as we can carry in our vehicles and drive north to the lovely seaport town of Newport, Rhode Island. We frequent one particular inn whose quaint cottages border the shoreline of one of the best diving coves in the area. The cove borders Narragansett Bay and protects divers from the swift currents that occur when the outgoing tide empties large quantities of water from this huge body of water.

Our first few dives in the protection of the cove were terrific. The underwater photographer in me was aroused by the great variety of marine life. Nowhere in the waters off New Jersey would I have the opportunity to see so many lobsters in such a confined area. Granted, they were all small, but a camera can do wonders to perspective. Fluke hopped across the sandy bottom, stopping occasionally to lie in wait for an unsuspecting

morsel; hermit crabs hustled across the sandy bottom, tucking themselves deeply into their shells as divers approached; and blackfish silently navigated through the kelp fronds, always remaining at the far edge of visibility. It was paradise and we never exceeded 30 feet in depth.

On our second afternoon, eager to relive the enthusiasm of our previous dives, my buddy, Debbie Sorensen, and I decided to dive off the point of land closest to the mouth of the bay. The ease of our previous dives lured us into complacency. We waded into the shallow water, trying to keep our balance on the slippery bottom. Worried about damaging my camera, I lowered myself to my knees and slithered into the shallow water, pulling myself around the larger boulders. Deb followed suit. Once in the



deeper water, we swam directly east, toward the open sea.

The bottom contour was much the same as the secluded cove. Kelp was abundant and tiny lobsters used the massive overgrowth to scurry from place to place. Large blackfish circumnavigated a large rocky pinnacle while baitfish filled the void overhead. We became mesmerized when a large school of ocean going fish streamed over our heads in hot pursuit of the tiny silver projectiles.

The gentle, outgoing current pushed us ever so slowly out to sea. Minutes passed and the kelp fronds that stood upright at slack tide began to yield to the increasing tide. Checking our pressure gauges and finding 1,000 psi remaining, we began our return trip. Our effortless outward swim turned into an exhausting struggle that seemed doomed to failure. We grabbed at every available handhold to pull ourselves forward. Very shortly, we had used half our remaining air supply and hadn't made

much progress. Panic began to set in. Terrified we would run out of air before we could make land, we surfaced to get our bearings. There was land, a mere 200 feet in front of us. We attempted a snorkel swim on the surface but the current was too strong. Down we went, resuming our hand-over-hand forward motion. We were forced to suck harder and harder to salvage every ounce of air available. Finally, we reached the outermost rock structure—saved—or so we thought!

We managed to pull ourselves out of the water and onto a small section of rock 20 or 30 feet from the jetty-like projection that would lead us to safety. We thought we would wait there for a while—until the tide went out—then wade to shore. The idea would have had merit had the wind not been pushing pounding breakers onto this section of rocks. Every large wave brought a punishing wall of water that attempted to tear us from our perch. The area surrounding our little outcropping was full of man (or woman) sized holes that spouted water with each breaker. We decided we had to try and reach the shore. Our strength was fading quickly and we would not be able to hold out much longer. I went first, falling uncontrollably into a deep pool of water. I banged my shoulder into the rocks, then a large wave pounded me against an adjacent boulder. Deb followed with little more success. We struggled for what seemed like hours, finally crawling to the water's edge and collapsing from sheer exhaustion. Near tears, we rested for 20 minutes, then began our trek to the cabin.

Our first encounter with our compadres at the cabin brought a barrage of angry words, directed at those who were near enough to hear them. (California might have been near enough on that day!) We told our friends that from our stony perch we could see them on the back deck of the cabin. We had screamed with all our might. After no acknowledgement, we resorted to our dive whistles, which brought an equally negative reaction. We wondered how strange it would be to succumb within eyesight of our friends and loved-ones; they would never know how close we were!

Have we been back to Newport again? Of course! But now we check those tidal charts. Every encounter with the sea brings a more profound respect for its superiority. I love the ocean but I now have a belief that travels with me always: Man will never best the sea, he can only hope to break even.

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